FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 106
No. 2218

APRIL 16, 1959

Registered at the G.P.O. as a Newspaper

Offices: John Adam House, John Adam St., London, W.C.2

Single Copy, 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)

THE UNIVERSITY OF MICHIGAN

MAY 8 1959

ENGINEERING LIBRARY

SAND

for Shell Moulding

and CO_2 Process

Enquiries to :—

THOS W. WARD LTD

TWW

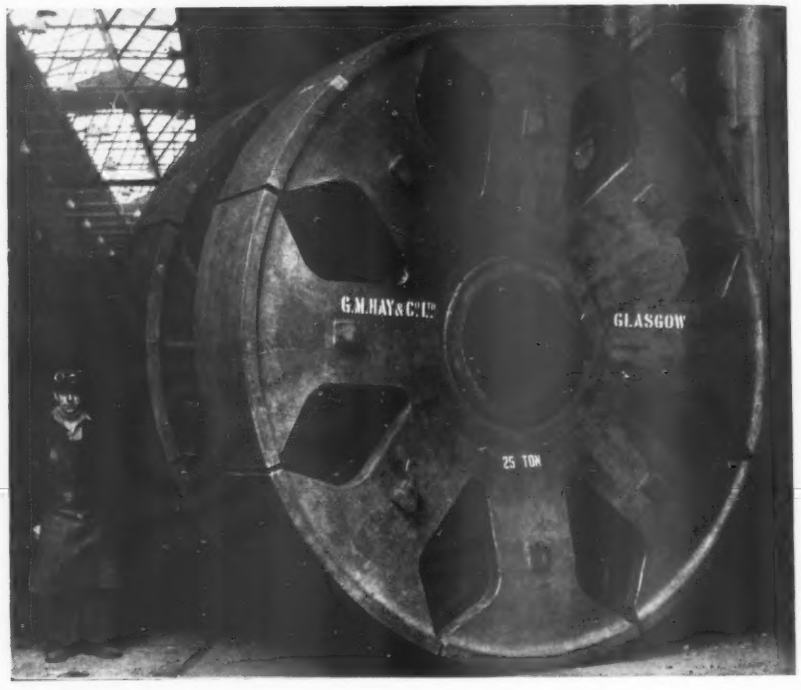
ALBION WORKS, SHEFFIELD. PHONE 26311 (22 LINES)

LONDON OFFICE : BRETTENHAM HOUSE LANCASTER PLACE STRAND W.C.2 Phone : TEM 1515 (12 lines)

Another Perfect Finish

Using Durrans No. 10 Prepared Blacking Grade "8" as on this heavy MEEHANITE casting

"Registered"



By kind permission of the Directors of Messrs. G. M. Hay & Co. Ltd. Glasgow

STEELMOL *for STEEL and SPECIAL IRON CASTINGS*

HIGH CARBON BLACKING · CEYLON PLUMBAGO
TERRA FLAKE · COAL DUST · GANISTER AND
"ALUMISH" FOR ALUMINIUM Non-Silica PARTING POWDER

JAMES DURRANS & SONS LTD

PHŒNIX WORKS & PLUMPTON MILLS · PENISTONE · near SHEFFIELD
Telephone: PENISTONE 3121 and 3122 *Telegrams:* BLACKING, PENISTONE

FOUNDRY TRADE JOURNAL

Vol. 106. April 16, 1959 No. 2218

Established 1902

Incorporating

IRON & STEEL TRADES JOURNAL

Single copy 1s.*; by post* 1s. 4d. *Annual subscription: home* 52s.*, abroad* 60s. *(prepaid)*

Editor:
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

Assistant Editor: A. R. PARKES, M.I.B.F.
Commercial Editor: P. E. CARDEN.

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER
Circulation Manager: E. T. GRIFFITHS

District Representatives:
G. P. ELLIOTT (Northern Area)
T. H. SMITH (Scotland)

The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association; and the National Society of Master Patternmakers.

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published Every Thursday by Industrial Newspapers, Limited

BARRINGTON HOOPER, C.B.E.,
Chairman and Joint Managing Director

F. BARRINGTON HOOPER, B.A.,
Joint Managing Director and Commercial Director

F. R. LEWIS, JOHN HOOPER, D. HORN
Directors

E. G. WESTON,
Director and Secretary

JOHN ADAM HOUSE,
17-19, JOHN ADAM STREET,
ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 *(Private Branch Exchange)*
Telegraphic Address: "Zacatecas, Rand, London."

PRINCIPAL CONTENTS

PAGE

Emissions from Iron Foundries

By F. M. Shaw, G.I.Mech.E.

Details are given of corrective measures which may be taken to reduce the emission of smoke, grit and dust from iron foundries 439

Booth for the Removal of Feeder-heads by Oxy-acetylene Cutting

Removal of feeder-heads of castings weighing from 10 lb. to 2 cwt. is dealt with 447

Provision of Protective Clothing: House of Lords Ruling

By "Barrister-at-Law" 449

Déchets émis par les Fonderies de Fonte. Des détails sont donnés sur les mesures correctives pouvant être prises pour réduire l'émission de fumées, de particules et de poussières par les fonderies de fonte. 439

Une chambre pour l'enlèvement des masselottes d'alimentation par découpage au chalumeau. 447

Das Entweichen von Rauch und Staub aus Eisengiessereien. Es werden Einzelheiten über Abhilfemassnahmen gegeben, welche angewandt werden können, um das Ausströmen von Rauch, grobkörnigem Material und Staub aus Eisengiessereien herabzusetzen. 439

Eine Putzkammer zur Entfernung von Giesskopfen durch Brennschneiden 447

Features, News, Commercial Information and Statistics

Leader: "The Right Pattern" 437
Hungarian Foundry Congress 438
Forthcoming Events 438
Equipment and Supplies 445
Law Cases 446
National Industrial Safety Conference 446
Northern Aluminium's New Venture in New Zealand 448
David Brown plans US Affiliation 448
Mill Housings for Durgapur Steelworks 448
Company News 450
American Letter 451
Publications Received 452
Notes from the Branches 453
Personal 456
News in Brief 458
Raw Material Markets 460
Imports and Exports of Iron and Steel in February 462
Current Prices of Iron, Steel and Non-ferrous Metals 464

August's LIMITED

FOUNDRY PLANT

in action for BATH MAKING

Photograph shows:

Belt conveyor with automatic plough arrangement for ploughing off reconditioned moulding sand into large storage hoppers.

Photograph published by courtesy of the British Bath Co. Ltd., Greenford

See us at

STAND 86

FOUNDRY EXHIBITION

Bingley Hall, Birmingham

Sole Licensees and Manufacturers for the British Empire (excluding Canada, Australia and New Zealand) of the Simpson Sand Mixer.

AUGUST'S LIMITED · HALIFAX · ENGLAND

Telephone : Halifax 61245/6/7/8 *Telegrams : August, Halifax*

J.J.M.

FOUNDRY
TRADE JOURNAL
Vol. 106 APRIL 16, 1959 No. 2218

"The Right Pattern"

This caption was used by *The Times* as a heading for its leading article on the Chancellor's Budget proposals. Whilst it is in every way well suited for crystallizing the paper's views on this subject, it is particularly apt for the foundry industry, as it is extremely difficult and uneconomic to make a casting from anything other than "the right pattern." The reliefs emanating from the provisions in the Budget—income tax £229 millions in a full year, purchase tax £81 millions—are widespread, and since the activities of the foundry industry cater for a universality of trades, all its varying sections should benefit ino m e degree.

Some adverse comments have been made on Mr. Heathcoat Amory's notion of encouraging efficiency by restoring the investment allowance to firms in respect of new plant and operating the new arrangements in conjunction with 10 per cent. initial allowance. From past experience, industrialists have come to suspect the permanence of these provisions, which are too unreliable for future planning. The reduction in purchase tax on certain finished goods will be of real value to foundries catering for the domestic market, which is an expanding one, and in this category one can include a large slice of the automobile industry.

A major objective of the Budget is to encourage capital investment for increasing the productivity and efficiency of industry. This involves purchases of machine tools, mechanical handling and automation devices, and other products which are large users of castings. Any major improvement in the demand for heavy castings will soon bring about a shortage in capacity; happily, in recent times means have been found for the better utilization of foundry floor-space and quicker deliveries. These should go far in meeting any increased pressure on this section of the industry. We do not envisage that a boom is just around the corner, but rather a steady increase in demand for foundry products.

Hungarian Foundry Congress

The whole programme of the first congress of the Hungarian Foundrymen's Section of that country's Metallurgical and Mining Institute (OMBKE) was carried through with great success in Budapest last week. It was attended from this country by Mr. A. R. Parkes (Assistant Editor of the JOURNAL) and a full .eport will be published shortly. The opening sessions on Monday were held in the Grand Salon of the "Hall of Techniks," in Liberty Square, where about 300 gathered at the formal opening by Mr. M. Szele, president of OMBKE, accompanied on the dais by Mr. F. Martos, chief secretary, and Mr. J. Szasz, head of the Foundry Section of OMBKE respectively. Later, technical sessions were held in different halls of the same building and all day on Tuesday also, sometimes with three simultaneous sessions. On Wednesday, approximately 60 delegates, including the foreign contingent of about 20 (almost all of these being from Eastern European countries), travelled to Gepgyar by coach, with sightseeing *en route*. Here the foundries attached to the wagon works of Wilhelm Pieck were inspected and the return journey was made *via* Lake Balaton (a round trip of over 200 miles). On Thursday there were two works visits in Budapest and on Friday the Research Institute for Foundry and other Metallurgical Industries was inspected. Yet a further technical session lasting until late evening was held in the "Hall of Techniks." Throughout the week a series of social functions was organized, including a visit to the Hungarian State Opera House on Tuesday evening. Throughout the whole meeting, generous hospitality and many courtesies were shown to the visitors and a feeling of friendliness prevailed.

London Office for VEDC

Last month a reception was held to mark the official opening of the new London office of the Vitreous Enamel Development Council at 28, Welbeck Street, W.1. Welcoming the guests were Mr. R. W. Holmes, deputizing for Mr. S. W. Vickery, chairman of the Council, who was unable to be present owing to his absence abroad, and Mr. K. G. Jones, the recently appointed general manager of the Council. Representatives of many other members of the Council were also present.

In a short address to the guests, Mr. Jones said that since the formation of the Council just over two years ago it had been successful in laying down minimum manufacturing standards among its members. The maintenance of enamel quality, which was a matter of vital importance in promoting wider use of the finish, was a matter of very great concern to the Council, which had been at pains to inform and educate the consuming public concerning the nature and properties of the enamel finish.

Mr. Jones referred to the Enamel Advisory Service which had been started in London for the benefit of housewives and industrialists to deal with the many problems encountered with regard to enamel finishes on domestic and industrial products. This service had been extended so that advisory bureaux existed in Birmingham, Cardiff, Glasgow, Manchester and Newcastle, and it was hoped to introduce further centres later in the year.

FIRTH-VICKERS STAINLESS STEELS, LIMITED, Sheffield, which recently received an order from Russia for 100 tons of steel, have now received a repeat order.

Forthcoming Events

APRIL 21

Institute of British Foundrymen

Slough section:—Annual general meeting followed by "Modern Developments in Sand Practice," by W. B. Parkes, 7.30 p.m., at the Lecture Theatre, High Duty Alloys, Limited.

APRIL 22

Institute of British Foundrymen

Birmingham branch:—Annual general meeting followed by a discussion on a casting project, introduced by S. M. Wrightson, 7.15 p.m., at the James Watt Memorial Institute, Great Charles Street.

London branch:—Annual general meeting followed by "Water-cooled Basic-cupola Practice," by T. C. Wilson, 7.30 p.m., at the Constitutional Club, Northumberland Avenue, W.C.2.

Institution of Plant Engineers

London branch:—Works visit to the National Physical Laboratory, Teddington.

Institution of Mechanical Engineers

London graduate section:—"Rubber in Engineering," by P. B. Lindley, followed by film, 6.30 p.m., at 1, Birdcage Walk, Westminster, S.W.1.

North Western graduate section:—Annual meeting followed by "Introduction to the Problems of Metal Fatigue," by G. M. Astles, at the Engineers' Club, Albert Square, Manchester.

APRIL 23

Combustion Engineering Association

"Capital Investment and Fuel-saving Schemes," by R. H. Potterill, 2.30 p.m., at the Engineers' Club, Manchester.

Institute of British Foundrymen

Northampton section:—Annual general meeting followed by "Some Practical Experiences in Making Moulds in a Mechanized Foundry," by H. Pinchin, 7.30 p.m., at the Plough Hotel.

West Riding of Yorkshire branch:—Works visit in the evening to Enfield Rollings Mills (Aluminium), Limited, Bowling Back Lane, Bradford.

Institution of Production Engineers

South Eastern region:—"Industrial Relations and the Production Engineer," by E. Fletcher, 7 p.m., at the Royal Commonwealth Society, Northumberland Avenue, London, W.C.2.

APRIL 24

Institute of British Foundrymen

Bristol and West of England branch:—Annual general meeting, 7.30 p.m., at the Royal Hotel, Bristol.

Institute of Vitreous Enamellers

Southern section:—Social evening commencing with dinner at Kettner's Restaurant, followed by visit to Cinerama.

Institution of Mechanical Engineers

London graduate section:—Annual all-day visit to De Havilland Engine Company, Limited, Leavesden, Herts.

APRIL 25

Institute of British Foundrymen

Lancashire branch:—Annual general meeting and presentation of John Wilkinson Memorial Medal and winning paper, followed by "Looking after the Apprentices," by H. Haynes, 3 p.m., at the Midland Hotel, Manchester.

Foundry Exhibition, 1959

Sir Frederick Scopes, one of the leading figures in Britain's iron and steel industry, is to open the Foundry Exhibition which is to be held at Bingley Hall, Birmingham, from May 21 to 30. Readers are reminded that the Exhibition will be open from 10 a.m. to 6 p.m. daily, excepting Sunday, and that admission is to be by voucher, obtainable in advance from stand-holders, or by trade card. Formal visits will be made by parties of members from the various branches of the Institute of British Foundrymen, there are also to be visits from the Founders Company and kindred associations. The FOUNDRY TRADE JOURNAL is responsible for the official exhibition catalogue which, in addition, will contain editorial descriptions, particularly of foundry plant and equipment, representing the current state of the industry and progress in post-war years.

Emissions from Iron Foundries

By F. M. Shaw, G.I.Mech.E.

Problems arising from the emission of smoke, grit and dust from iron foundries have been closely investigated in recent years. Although an economic solution has not yet been determined in every case, the work done has been sufficient to show that much of the emission can be reduced. The article abstracted in what follows discusses various corrective measures, and the application of available equipment to a wide variety of foundry processes.

The 1959 edition of *Fuel Economy Review*, published by the Federation of British Industries, contains eleven papers on a diversity of subjects—ranging from incinerator plant to cathodic protection. One which has major interest for the foundry industry is by Mr. F. M. Shaw (of the British Cast Iron Research Association) entitled "Emissions from Iron Foundries," in which suppression of grit and dust from cupolas and other foundry furnaces is dealt with. What follows is abstracted from Mr. Shaw's text.

General

Ironfounding is one of the oldest basic industries. Its importance has increased rather than decreased with the years, and most major industries consume large quantities of iron castings. To take typical examples, in 1957, out of a total output for the industry of approximately 3,700,000 tons, the automobile industry consumed 520,000 tons, the machine-tool industry 200,000 tons and the steel and non-ferrous metals industries 430,000 tons for ingot-moulds and -bottoms alone. To achieve this output some 1,000,000 tons[1] of coke was consumed, together with lesser amounts of coal (solid and pulverized fuel), oil and electricity.

The size and output of foundries varies very widely. The figures in Table 1 are based on 1955 returns.

TABLE 1.—*Analysis of the 1955 Output of Various-sized Iron Foundries.*

Annual output.	No. of foundries.	No. of foundries as percentage of total.	Output as percentage of total.
Not more than 100 tons ..	287	16·0	0.37
101–200 tons	206	11·4	0·78
201–1,000 tons	724	40·2	9·34
1,001–5,000 tons	447	25·0	24·44
5,001–10,000 tons	72	4·0	12·68
Over 10,000 tons	63	3·4	52.39
	1,799	100.0	100.0

Thus, 65 per cent. of the output is produced by under 8 per cent. of the foundries and it takes 68 per cent. of the total number of foundries to produce 11 per cent. of the annual output. This emphasizes that there is a large proportion of small units in the industry—an important consideration when the economics of air-cleaning devices are being considered. Air pollution caused by foundries falls into two main categories, *i.e.*, that from:

(*a*) metal-melting and heat-treatment, and

(*b*) other operations (moulding, knocking-out, etc.).

Generally, the first category represents the major problem. Of the melting furnaces used in iron foundries, the cupola is by far the most popular, though other types of furnaces are used, primarily for malleable and special alloy irons.

(Under "cupola melting," the basic design and operational data of the furnace are then summarized in the complete paper, and factors affecting rates of dust and fume emission are dealt with in some detail.)

EMISSIONS FROM CUPOLAS

The rate of emission from cupolas is very variable, ranging from perhaps 10 to 50 lb. per ton of metal melted, 20 to 30 lb. being an average figure. Amongst factors which influence the weight of particles emitted are: (*a*) Proportion and characteristics of the coke; (*b*) amount of sand, rust, etc., adhering to the pig-iron; (*c*) dust contained in the slag-making fluxes, and (*d*) method of charging.

Before the gases can be cleaned, their quantity and temperature must be known. The rising gases contain up to 16 per cent. carbon monoxide and are therefore combustible. The temperature decides whether or not they ignite with the air induced at the charging door. This is very variable and may be anything from 200 to 600 deg. C. when running normally. At a temperature above some critical temperature depending on the gas composition, but usually about 450 deg. C., the gases ignite and their temperature is even further increased. The gas temperature when normally running can thus be anything from 200 to 900 deg. C. During the blowing down period this can rise to over 1,200 deg. C. The total gas volume will be increased by air induced through the charging door. The weight of air induced is not normally less than two to three times the blown air weight and in exceptional circumstances may go up to ten times. If the induced air is much less than three times the blown air weight there is a risk of gas leakage at the charging door—a serious consideration (when men are working near the door) because of the potential carbon-monoxide hazard.

Variable Particle Size

The particle size of the dust is very variable. American information[2] suggests that very roughly, 50 per cent. is under 50 microns, 20 per cent under 20 microns and 10 per cent. under 10 microns (1

micron = 0.001 mm. Particles over 76 microns can be considered to be grit). Recent work carried out in this country (unpublished) indicates that an even larger proportion of very fine particles under 10 microns may be present. Thus the problem to be faced is that of cleaning large volumes of hot gases. In addition, the gases are potentially corrosive since they contain sulphur oxides from combustion of the coke.

Gas-cleaning Methods

The same gas-cleaning methods which apply to other dusts can be applied to cupola dust, although modifications may have to be made to suit the high temperatures encountered.

Any of the following gas-cleaning methods may be used for cupolas.

(1) *Expansion of the gases.* This reduces the gas velocity, and causes the heavier particles to settle out by gravity. By itself, this method cannot remove any but the heavy particles (down to, say, 150 microns) unless uneconomical expansion-ratios are employed.

(2) *Sharp changes in direction of the gas stream*—the inertia of the particles tends to make them leave the gas path.

(3) *Separation, by utilizing mechanically-imposed forces,* as in the cyclone, where centrifugal force is used.

(4) *Filtration* through woven fabrics or particulate beds (*e.g.* bag filters, coke beds, etc.).

(5) *Scrubbing with water,* etc.

(6) *Separation, utilizing electrically-imposed forces* (electrostatic precipitation).

(7) *Venturi scrubbing.*

Expansion/Deflection Devices

Few, if any, collectors rely entirely on expansion to deposit particles, but a cupola-top should preferably be weather-proofed, and this involves some structure (baffle, etc.) which deflects stack gases. Two main categories of arrester utilize this principle:

(1) A penthouse over the top (one or more cupolas). Baffles are often fitted above each stack to take the full force of any flame and so protect the penthouse sheeting. The expansion ratio:—

$$\frac{\text{Floor-area of penthouse platform}}{\text{Stack-area of working cupolas}}$$

affects the weight of dust deposited, and it appears likely that expansion ratios of not less than 100 are required to settle out most of the particles over 150 microns.

On cupola dust this would give a collecting efficiency of 20-30 per cent. Where availability of water supplies is a problem, this seems to be the only economic answer to cupola emissions. It should be noted that removal of 30 per cent. of the emission reduces the maximum rate of deposition very much more than this[3]—by possibly 70 per cent. or more.

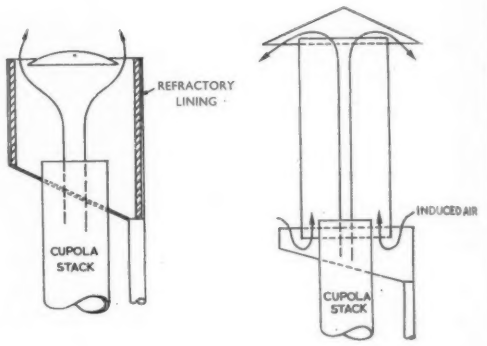


FIG. 1.—*Showing (left) the expansion/deflection chamber type of cupola-stack dust-arrester, and (right) a method of introducing cool air at the base of the expansion type of dust-arrester.*

(2) An expansion/deflection chamber usually mounted separately on each cupola [Fig. 1 (left)]. This has been the type of arrester most commonly fitted until recent years. It relies on expansion in the chamber (about four times), and deflection from a baffle or cap over the exit, to deposit the grit. The expansion is far lower than that obtainable in a penthouse and the collection efficiency therefore is much less. Very little dust below 200 microns will be collected and a considerable proportion of over-200 micron particles is likely to be emitted.

This type of arrester will reduce the amount of grit falling on adjacent roofs but its collecting efficiency is rather low—probably 5-15 per cent. by weight. Efficiencies at the top end of this range are achieved by the highest-practicable expansion ratios (about five times).

Cooling air can be induced round the bottom of the arrester [Fig. 1 (right)] which allows lighter construction, since a refractory lining can then be dispensed with. It has frequently been stated that cooling air induced into any simple arrester will increase its efficiency by cooling the stack gases, so reducing their volume and velocity, and allowing smaller particles to gravitate out of the gas stream. This, however, is a misconception. Any induced air (which is itself heated up and expanded) increases the final volume of gas to be handled.

Other Expansion/Deflection Arresters

Numerous other expansion/deflection arresters exist. A common version is a fairly-large (say, 15 by 20 ft.) refractory-lined expansion chamber into which one or two cupolas discharge. The chamber is equipped with baffles and a common chimney exhausts the gases. Efficiency here will be between that of the simple arrester [Fig. 1 (left)] and the penthouse type.

A rather more complicated type of arrester, which depends on deflection and inertia of the particles, has been used[4]. The collector is a louvred-cone

(Fig. 2). The dust-laden gas is drawn through the cone by a fan. Some of the dust passes straight through the cone where it is bled off with about 5 per cent. of the gas for final cleaning in a cyclone, the cleaned gas being returned to the cone inlet. This collector is probably 30 to 40 per cent. efficient (based on size analysis of collected dust) when presented with cupola dust. Without some form of gas cooling it could not operate during the blow-down period (lasting approximately half an hour at the end of the cupola " blow ").

Cyclonic Collectors

Various types of cyclone can be fitted to cupolas (Fig. 3). Their efficiency would be expected to lie in the range 50 to 80 per cent., depending on whether a large low-pressure-drop cyclone, or the smaller high-efficiency type, is installed. The system must include gas cooling, and be powered by a fan.

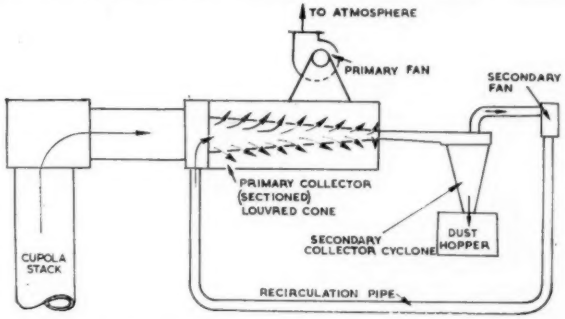


FIG. 2.—*Louvred-cone type of dust-arrester for cupolas.*

Wet-type Collectors

This covers a wide range of collectors. The simple spray-and-baffle type collector (Fig. 4) is the most efficient type of collector at present fitted to cupolas in this country. The system consists of a cone over the top of the stack, surrounded by an expansion chamber. Water is pumped over the cone and washes the grit and some dust out of the gases and returns them to a settling tank.

Advantages of this type of collector are:

(1) Capital cost is small when compared with other types of collector (but it still costs about as much as the furnace to which it is fitted).

(2) The collector can handle the very hot gases produced during the blow-down period (up to 1,200 deg. C.) without the need for gas cooling.

(3) Operation is very simple.

(4) Running and operating costs are low, provided that maintenance is adequate.

(5) Its collection efficiency is about 60 per cent. For such a cheap, simple installation this is surprisingly high when compared with more conventional collectors adapted for use on cupolas.

(6) Roof deposits become negligible.

(7) One-third to one-half of the sulphur oxides can be removed from the stack gases.

(8) The unit is powered by stack draught alone, no fan being necessary.

Disadvantages include:

(*a*) The water, if recirculated (as is usually the case), becomes acid, due to sulphur absorption from the gases. Neutralization of this acid is of the utmost importance, otherwise very rapid deterioration of the whole plant takes place. Soda ash is an effective and cheap neutralizing agent. Not more than 1 lb. of soda ash per 100 lb. of coke burnt is likely to be required. This should be predissolved and added to the settling tank. Periodical tests with litmus paper are recommended to ensure that the water never becomes acid. The exact amount of soda ash required can easily be found by trial and error.

(*b*) The gases, which still contain the finer dust particles and some sulphur oxides, are cooled and dispersal therefore becomes slower. While this makes for bad conditions in high chimneys, *e.g.*, power-station chimneys, it is not likely to make much practical difference in the case of cupola stacks, which in the majority of installations will not exceed 60 ft. above ground level. This is because even hot gases can be quickly brought to ground level when exhausted into the highly turbulent layer of air which usually exists near ground level.

(*c*) A considerable quantity of water is required, even if the water is circulated. Approximately half a ton of water will be used for every ton of iron melted. The loss is due primarily to evaporation and frequent draining of the settling tank. In some cases it may be impossible to obtain the required amount of water.

(*d*) Water from the settling tank has to be disposed of. Many River Boards have stringent regulations regarding the effluent which may be put into streams, etc. However, as far as can be seen, with neutralization of the water, frequent drainage of the settling tank to prevent dissolved-solids build up, and 12 hr. settling time prior to draining, the effluent water can meet the limits imposed at present.

This type of collector is now being installed in large numbers throughout the country, and represents the only economic answer at present known to the grit and dust problem caused by cupolas in medium and large foundries.

Very high collection-efficiencies can be attained by disintegrators and venturi scrubbers (in the

region of 99 per cent.). They are, however, expensive in capital cost, and the former especially uses a great deal of power. Venturi scrubbers have performed satisfactorily on a pilot-plant scale[5].

Electrostatic Precipitation

In certain areas of the USA (notably Los Angeles) the high standards of gas cleaning required have led to the use of electrostatic precipitators on a number of cupolas. The gas is cooled and conditioned by controlled water-sprays. Efficiencies of 95 per cent. and over can be achieved. Even so, from some installations at least, a haze of metallurgical fume still escapes.

Fabric Filtration

For very high efficiencies, fabric filters offer many advantages, and a number of Los Angeles cupolas

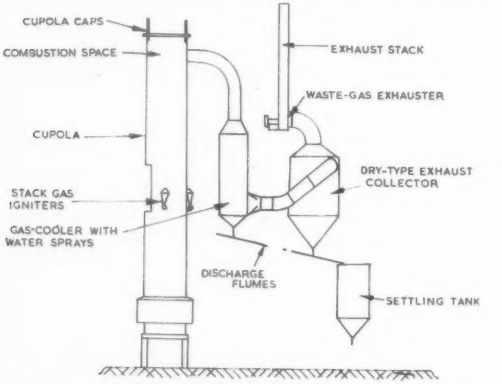


FIG. 3.—*Typical installation of a dry cyclone cupola collector.*

have been so equipped. Capital cost is less than that of electrostatic precipitators, though maintenance costs are higher. A number of installations employing woven glass fibre or orlon bags have been in successful use for some time. Collection efficiencies of 99 per cent. can be achieved. The gases must be cooled to below the limit which the various filter fabrics will withstand. Evaporative cooling is usually employed but one early and successful plant[6] employs radiation-cooling (eight 45-ft. high mild-steel U-bends, 38 in. dia., carried by a common hopper).

Cupola Fume

Cupolas emit some metallurgical fume consisting mainly of iron oxide, which is well under 5 microns in size (probably under 1 micron). It is thus difficult to collect even with the most expensive equipment. Low-velocity electrostatic precipitators and bag filters, or high-pressure drop Venturi scrubbers, offer the only known means of removing this fume from the gas stream, and even so, 100 per cent. removal could not be guaranteed. Cupolas melting only pig-iron and cast-iron scrap make very little fume. Large amounts of fume seem to be associated with the melting of high proportions of steel scrap, which is often necessary for metallurgical and economic reasons.

Cupola Smoke

If a gas torch or correctly-adjusted oil-burner is used for lighting up, and only clean scrap is charged, a cupola will make hardly any smoke, since the fuel used (hard metallurgical coke) is virtually smokeless. However, scrap contaminated with oil, etc., has often to be melted, and this can give rise to considerable quantities of smoke. If the cupola stack has sufficient height and width (20 ft. high and width at least equal to the melting-zone dia.) the smoke can be burnt with the stack gases, which contain up to 16 per cent. carbon monoxide. Combustion depends on keeping the gas temperature above about 450 deg. C., and this can be done by lowering the level of stock in the cupola stack. This unfortunately reduces its thermal efficiency somewhat, but is the only known way of removing smoke in a cold-blast cupola. (In a recuperative hot-blast cupola, some or all of the stack gases are removed and burnt in a heat-exchanger which heats the combustion air. At present, however, hot-blast plants are only economic for relatively large plants representing a small proportion of cupolas.) Unless perfectly clean scrap can be melted, some smoke is inevitable for the first 10 to 20 min. of the blow, when the stack is cold and suppresses combustion of the stack gases.

FURNACES OTHER THAN CUPOLAS

The cupola melts 90 per cent. or more of the industry's requirements for molten metal. Of the remainder, blackheart malleable iron is normally melted in air or rotary furnaces. Air furnaces are also used for roll-making. Some electric furnaces (mainly induction or direct-arc) are also used for melting highly-alloyed irons.

Air Furnaces

When air furnaces are oil-fired, smoke is generated at the beginning of the melting cycle, caused by the impingement of the oil on the cold metal charge. This is unavoidable, but can be reduced to a minimum if a lighter oil can be used during the initial stages. This considerably complicates the firing system, especially in the case of existing furnaces. When pulverized-fuel firing is used, smoke can be made during the early stages of a melt; however, the major problem is one of grit and dust. The problem is rather worse than for pulverized-fuel-fired boilers because of the high gas temperatures (over 1,000 deg. C. at certain times). When steam is required, a waste-heat boiler can be used as a flue-gas cooler. The heavier grit will drop out in the heat-exchange system, and further collection can then be effected by cyclones.

Rotary Furnaces

In principle, these only differ from air furnaces in that the whole furnace is cylindrical and revolves

about its horizontal axis. This gives faster melting and more intimate contact between metal and slag. The emission problem is roughly the same as for oil or pulverized-fuel-fired air furnaces.

Electric Furnaces

Generally, electric furnaces used for melting cast-iron will emit less fume than similar furnaces melting steel, since the temperatures involved are lower. Electric melting is rarely used for cast-iron except for special alloys, each of which will produce its own set of conditions, and no general rule can be laid down as to whether appreciable quantities of fume will be produced.

No combustion air is used in electric melting and consequently there is no carrying medium for grit, dust or fume. Ventilation can be applied in many cases to contain any fume generated during melting, and the ventilated air can be cleaned. Removal of the small-particle-size fume will require one of the high-efficiency collection devices (fabric filter, electrostatic precipitator, Venturi scrubber, or disintegrator). Fabric filters are known to have been used successfully[7]. If a lower cleaning-efficiency can be accepted, standard wet-washers can be used which also eliminate the gas-cooling problem.

Malleablizing

Some special cast-iron whiteheart and blackheart malleable) is subjected to a long heat-treatment process to make it comparatively soft and ductile. This heat-treatment process is known as "annealing" or "malleablizing." The majority of "hard" castings, after preliminary cleaning and dressing, are packed in pots and stacked in 5- to 25-ton batch furnaces. Heating is carried on for several days before the now-soft castings are removed for final cleaning and dressing. Various methods of heating are used, as follows:

Solid Coal

This once-common type of furnace is no longer built and existing units are being slowly replaced or changed to oil firing. Considerable smoke is emitted at the begining of the annealing cycle when the furnace is cold, and intermittent emission usually occurs when the furnaces are hand fired.

Pulverized Fuel

Pulverized coal is commonly used for firing, and leads to the same grit difficulties as are encountered with small pulverized-fuel-fired boiler installations, *i.e.*, while it is possible to fit efficient collectors, it is very costly. The furnace atmosphere must be carefully controlled for metallurgical reasons, and this leads to a more or less continuous emission of light smoke (no more than Ringelmann 1). Some dark smoke is emitted when lighting-up the cold furnace.

Oil Firing

Some smoke is still emitted when furnaces are started from cold, especially if heavy oil is used. When up to temperature, they can be controlled to give the correct atmosphere and little or no smoke. However, occasional bursts of smoke will occur when burners are relit, etc. Again the smoke problem is not quite the same as for oil-fired boilers, since a reducing atmosphere must be maintained in the furnace to give the required properties in the castings. This occasions some, at present unavoidable, smoke.

Electric-furnace Annealing

Some controlled-atmosphere electric-furnace annealing is practised, but this is limited to relatively small castings which are self-supporting (*i.e.*, they are not packed in an inert material or hematite ore). The process is, of course, smokeless and has many advantages where it can be applied.

Vitreous Enamelling

Large numbers of light castings are vitreous enamelled. Briefly, this means that a glass-like enamel is fused on to the metal surface. Much of the enamel is applied in an aqueous spray and is therefore dustless. Baths and other castings requiring a heavy coating receive their enamel in a dry form while still red hot. This process is dusty but is capable of control, though this is costly because of the large air-volumes to be handled. The problem is mainly an internal one rather than external, since the dust which escapes from the building is fine, light-coloured and relatively small in quantity.

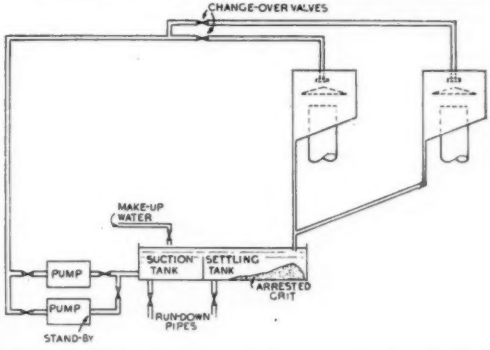


FIG. 4.—*Typical two-cupola wet spark and grit arrester system.*

The furnaces used for heating the castings for the enamelling process are normally gas-, oil- or electrically-heated, and are smokeless.

Coremaking and Mould Drying

Most sand cores which form the internal surfaces of the final casting are made from silica sand, to which an organic binder of some sort is added (linseed oil, starch, synthetic resins, etc.). To develop its strength the sand core has to be stoved after leaving the corebox. Large cores are put into batch-type ovens, while smaller cores usually go through vertical continuous stoves. These are fired by coke, oil or gas, so that there is no emission problem from the combustion gases. However, the cores themselves may give off odorous, and sometimes visible and lacrimatory, fumes which are

molecular and cannot thus be filtered from the carrying gases. Combustion by adding air and extra heat seems to be the only possible answer but this is hardly economic. Catalytic oxidation could also be used, but again this would be costly, especially since some pre-heat would still be required in most cases and insufficient heat would be released to be used for other processes. Batch-type stoves are also used for drying some moulds. The emission problem is negligible since coke or oil are commonly used as fuels and the moulds themselves produce very little fume.

Pouring

When molten metal is poured into the assembled mould and cores, fume is evolved. The amount will depend on the type of moulding sand (which may contain coal dust or pelleted pitch) and the type and quantity of cores used. Initially the fumes are hot and they will burn. However, their temperature soon drops and prevents combustion. In unmechanized foundries (the majority by number) this fume is released all over the foundry floor and little can be done about it. Mechanized foundries frequently incorporate a cooling track where most of the fume is released. This can be covered in and the fume exhausted through a stack. The problem is thus removed from inside to outside the foundry. Even if the fume can be collected into a duct, treatment is difficult. Only combustion could eliminate it and again this is economically impossible.

Carbon-dioxide hardening for moulds and cores can reduce baking and pouring fume. At present, however, its use is limited and often necessitates the use of other additions which fume in contact with molten metal. There are no other major processes used in the industry which use fuel or give off products due to the action of heat.

Ancillary Operations

Separation of the casting from the sand mould in which it was cast, and subsequent cleaning operations, can all cause the release of dust and grit. A brief summary of these operations is worth consideration.

Knocking-out

The casting, sand and moulding box are separated either where the casting is poured or, in the case of mechanized foundries, at a knock-out station equipped with a vibrating grid. Air exhaust can be applied to the grid and the dust-bearing air-streams passed through a collector. Wet collectors are normally used for this purpose because the moisture usually carried by the gases can cause difficulties with fabric filters.

Surface Cleaning

Most castings are shotblasted. Dust control and collection is an integral part of commercial shotblast units. In a few large foundries making big castings, cleaning is done with high-pressure water and sand (the Hydroblast process)—this is dustless. Hand brushing is still used to a decreasing extent. Dust control is possible—a fabric filter being ideal for collection.

Grinding

Swing-frame, pedestal and portable hand-grinders are in common use in ironfoundry dressing shops. Efficient dust control has been developed for all these grinding operations and conventional dust-collectors (usually fabric filters) can deal with the dust in the exhausted air.

Conclusion

The air-pollution problem posed by the ironfounding industry is caused mainly by melting processes—notably cupola melting, since this is the most commonly used type of furnace. Other processes, in particular malleablizing, can cause difficulties, but this accounts for only 4 per cent. of the industry's output. Other foundry processes can be controlled if, as in the case of mechanized foundries, the various processes are carried out at specific points and not scattered all over the foundry area.

Great efforts are being made by ironfounders to clean up their effluent gases and exhausted air. However, the goal of complete cleanliness will take a long time to achieve; economic solutions simply do not exist for all the problems. Two of the major difficulties are filtration of metallurgical fume and the removal of the characteristic foundry odour liberated by core-drying and mould-pouring.

Acknowledgments

The author wishes to thank the Director and Council of The British Cast Iron Research Association for permission to publish this article.

REFERENCES

[1] *Iron and Steel Board Annual Statistics*, 1958. 90 per cent. of output achieved with 900,000 tons. Total figure scaled up from these figures.
[2] Bureau of Mines *Circular* No. 7627, 1952, April.
[3] "Role of the Cyclone in Reducing Atmospheric Pollution," by C. J. Stairmand and R. M. Kelsey, *Chemistry and Industry*, 1955, No. 42 (October 15), pp. 1324-1330.
[4] "Installs New Cupola Dust Collector," by W. H. Howells, *Foundry*, 1950, **78**, 242, 244.
[5] "Venturi Scrubbers for Cleaning Cupola Gases," by B. Basse, *Journal* of the Air Pollution Control Association, 1957, **6**, 218-220.
[6] "Glass Bags Clean California Air," by P. Siechert, *Iron Age*, 1952, **169**, 78-80.
[7] "Smog Control in the Foundry," by Harry Dok, *American Foundryman*, 1954, **26**, 46-49.
See also "Cupola Grit and Dust Arresters," by G. E. Lunt, FOUNDRY TRADE JOURNAL, **105**, 651.

Milan Fair

The 37th International Samples Fair is being held in Milan (April 12 to 27). One of the principal stands is that of A. Triulzi (UK agents Alex. Cardew, Limited) who are displaying a selection from their range of die-casting machines. Both water and oil hydraulic machines are being exhibited on this stand, including a "Castmatic 600," which is an oil-operated wedge-lock machine of 600-tons capacity.

FIFTEEN APPRENTICES of the Staveley Iron & Chemical Company, Limited, Chesterfield, are to make a nine-day round-Britain trip for a close-up view of the steel industry. Their tour of 1,000 miles will take the trainees first to Wales, then on to Scotland, and back down the east coast of England.

Equipment & Supplies

Flux-dispenser for Molten Cast Iron

Equipment to introduce fluxes into the body of a melt to permit reactions to take place more rapidly, and with greater efficiency, has been developed by the British Oxygen Company, Limited, Cleveland Row, London, S.W.1. Known as the "BOC Metallurgical Powder Dispenser," the equipment is based on the principles of the company's existing dispensers. Capacity of the hopper is approximately two cub. ft., and it holds 150 lb. of calcium carbide or 100 lb. of graphite. It is not necessary to use the full charge in one operation. Discharge rate of the powders is up to 30 lb. per min. depending on the pressure applied, and the equipment can deliver either gas or gas-powder with selection by lever movement.

Desulphurization and Recarburization

It is claimed that the dispensing techniques can be of great value in the manufacture of cast-iron. Desulphurization with calcium carbide, and recarburization with powdered graphite, are two processes which are technically and economically successful. Both these materials may be injected by means of a stream of nitrogen, the powder entering the metal through a graphite or refractory lance. The treatment may be carried out in ladles following melting, or directly in high-frequency induction furnaces. It may also be done following melting or during storage in any other type of unit. It is claimed that sulphur may be removed with calcium carbide virtually to any required value, although the usual minimum is 0.02 per cent., the treatment time being of the order of one to two min., depending on the metal weight and degree of desulphurization required. A dry, easily-removable slag consisting mainly of unfused lime is produced. There is no pick up of nitrogen by the melt and, in fact, some evidence suggests an improvement in mechanical properties due to the refining of the structure of the iron. Recarburization is carried out using graphite in a stream of nitrogen. The process is normally applied for treating iron with an initial carbon content of at least 3.0 per cent. It is equally suitable for irons of lower carbon content. It is claimed that there is considerable scope for this process in the manufacture of high-carbon iron, and in the recarburization of melts produced from high proportions of steel or cast-iron scrap. Here, the ability to recarburize offers a most economic prospect because of the difference in cost between pig-iron and scrap. By using mixtures of calcium carbide and graphite it is possible to desulphurize and recarburize simultaneously.

Portable Power-hacksaw

W. Kennedy, Limited, West Drayton, Middlesex, announce a number of technical improvements in their design of the portable power-hacksaw. The capacity of the hacksaw has been increased to 2⅜ in. and the ¼-h.p. Hoover motor now has a thermal-overload control. If the hacksaw stops accidentally the motor cuts out automatically, thus eliminating the risk of a burn-out of the windings. A new zero-cutting edge is incorporated, by means of which the extreme edge of the vice-jaw indicates the path of the saw cut. Additionally, the vice-jaw is now calibrated in fractions of an inch, so that short lengths of material can be cut off without the need for marking. The screws on the saw-blade clamps are now placed for greater convenience on the right-hand side of the saw, and the saw-frame arm is fitted with a handle which enables the release-catch to be operated by thumb pressure alone. A major advantage of the saw is that it frees the operator for other jobs after he has set up the work and started the electric motor, since the hacksaw finishes the job without any further supervision. Pedestals, tripods and other accessories are available.

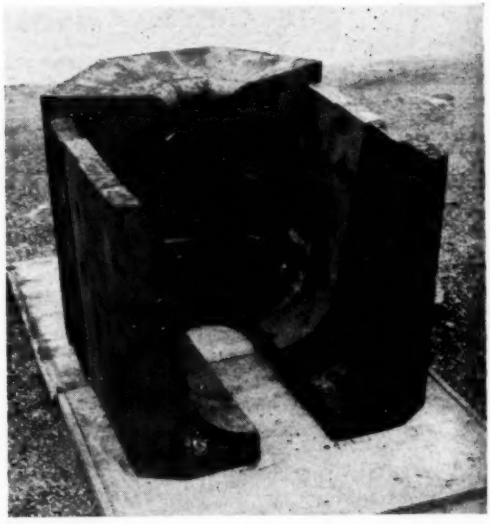


FIG. 1.—*Combustion chamber, constructed of high-alumina concrete, developed by J. Bartholomew & Son, Limited, of Stoke-on-Trent.*

Combustion Chamber

J. Bartholomew & Son, Limited, Star and Garter Road, Longton, Stoke-on-Trent, have developed a Patent combustion chamber. Since the chamber material would have to withstand the arduous thermal-shock conditions of normal on-off oil-burner operation, a high-alumina concrete was chosen. In this way large pre-cast sections could be employed without danger of cracking and spalling, and flexibility in design could be maintained. The object has been to design a shaped chamber which comes as close as possible to the ideal required by fuel engineers, while at the same time maintaining simplicity and flexibility of the units employed. The resulting combustion chamber is shown in Fig. 1. Various sizes to suit most boilers are available, and specially-shaped sections will be supplied if required.

Spray-gun

Alfred Bullows & Sons, Limited, Long Street, Walsall, announce the introduction of a new automatic spray-gun, the L540, which supersedes their L500 model. The weight of the new model is 19½ oz., as compared with the 41-oz. weight of the L500, but the interchangeability of the internal component parts has been retained. For added ease of operation all hoses come away in the line of the gun, and it is claimed that this feature will allow it to be used in positions previously considered impossible. Nozzle set-ups are interchangeable with those used on the Bullows-Binks L1900 spray-gun.

Law Cases

What a Skilled Man Should Know

Deciding that a county court judge was wrong in thinking that he was bound by judicial authority on a question whether an employer was negligent to an employee, the House of Lords allowed an appeal by Qualcast (Wolverhampton), Limited, light repetition ironfounders, etc., from a decision of the Court of Appeal (the Master of the Rolls, Lord Justice Parker, and Lord Justice Sellers) affirming Judge R. H. Norris at Wolverhampton County Court, and holding in favour of a plaintiff workman, Mr. John Henry Haynes.

Judge Norris held that the employers had been negligent in failing to inform Mr. Haynes that protective spats were available and to educate him to wear protective clothing in his work. Mr. Haynes, an experienced moulder, had been employed, for some 12 or 13 weeks when, in September, 1954, he was injured by molten metal splashing on his foot. At the time he was not wearing protective spats which would have saved him from injury. The man knew the company provided these, but had not been ordered or advised to wear spats because he was an experienced workman.

Lord Keith of Avonholm said, in his opinion, the county court judge had misdirected himself in holding that he was bound by judicial authority and was precluded from deciding that Haynes was so experienced that he needed no warning about the advisability of wearing protective spats. An employer's duty to a workman might vary with the workman's knowledge and experience. Haynes knew that spats were available, and in the circumstances of the case he could not hold that the employers had further duty to bring pressure to bear on him to use them.

Lord Radcliff, Lord Somervell and Lord Denning agreed. Lord Cohen dissented. (See also page 449 of this JOURNAL.)

Protective Screen Unstable

At Staffordshire Assizes, Mr. Justice Ashworth awarded damages of £512 10s. to Mr. Robert Owen Pearce who claimed against his employers the Sinclair Iron Company, Limited, alleging negligence which caused him to sustain an injury to his foot. Pearce, a caster at the defendant company's works at Ketley, Wellington, was pouring molten metal, in December 1956, when a protective screen moved, tipped his wrist and caused the metal to spill over his foot.

In his judgment, Mr. Justice Ashworth said the question of whether the screen should be made stable was one which vexed the foundry manager considerably, and among the problems was whether it should be anchored. He was satisfied that it was sufficiently unstable to be moved by a relatively small push. The men were engaged in a job which undoubtedly involved them all in a serious risk and it was a job which called for constant care. He took the view that this was a case where the duty not to expose men to an unnecessary risk was not fulfilled. He thought negligence had been established. On the application of Mr. John Garrard for the defendants the judge granted a stay of execution for 28 days.

STANTON IRONWORKS COMPANY, LIMITED, are to start immediate delivery to Burma of spun-iron pipes worth about $160,000. The pipes which are 6- and 12-in. dia. are fitted with Tyton joints and have been ordered by the Rural Sanitation and Water Supply Board of Rangoon.

National Industrial Safety Conference

Largest industrial safety conference ever to take place in Britain will be held at Scarborough from May 8 to 10. The conference, organized by the Royal Society for the Prevention of Accidents, will be attended by delegates from the majority of industries in the country, and among overseas visitors will be Mr. Marcel Robert, chief of the occupational safety and health division of the International Labour Office, who will present the opening address at the conference.

Mr. Brian Shackel, research psychologist of E.M.I. Electronics, Limited, will discuss how safety is affected by the fundamental design of machines; the general manager (general) of Stewarts and Lloyds, Limited, Mr. W. M. Larke, who is also the deputy chairman of the British Iron and Steel Federation's Accident Prevention Committee, will speak on ways in which administrative departments can help in the maintenance and improvement of works safety standards, and the particular problems of preventing falls in the building industry will be considered in a paper to be given by Mr. J. A. Hayward, superintending safety officer of John Laing & Son, Limited.

At the conference the presentation will take place of the Sir George Earle trophy by Sir Howard Roberts, president of the RSPoA. The trophy, the 1958 holder of which is Imperial Chemical Industries, Limited, is awarded annually to the company or organization making the most meritorious contribution to industrial accident prevention.

All inquiries about the conference should be addressed to the Industrial Safety Division, Royal Society for the Prevention of Accidents, Artillery Mansions, 75, Victoria Street, London, S.W.1 (telephone: ABBey 6963).

Unemployment and Short-time Working decline

Details of last month's drop in unemployment, already referred to by the Minister of Labour, Mr. Iain Macleod, in the House of Commons, reveal that in addition to the fall of 58,000 in the number out of work, there was a rise of 26,000 in the number of vacancies. There was also a significant decline in the amount of short-time working in manufacturing industry.

On February 21 there were 132,000 on short-time—35,000 fewer than in the previous month. The number working overtime also went down—to 1,305,000, 59,000 fewer than last November and 171,000 fewer than a year previous.

Expressed as a percentage, unemployment on March 9 was 2.5 of the insured population, compared with 2.8 for February and 2 per cent. in March last year. There were, however, 23,000 fewer in civil employment, compared with the previous month and 250,000 fewer, compared with a year ago. The main reduction over the month was in mining and quarrying —5,000.

Areas where unemployment was above the national average were:—Northern Ireland (8.7), Scotland (4.8), Wales (4.6), Northern (3.6), North-Western (3.2), and South-Western (2.6). The following were below the national average:—East and West Ridings (2.2), Midland and Eastern and Southern (1.9), North Midland (1.7), and London and South-Eastern (1.5).

Booth for the Removal of Feeder-heads, by using an Oxy-acetylene Burner

The publication by the *Centre Technique des Industries de la Fonderie* (French foundry technical centre) of descriptions of plant for the rational conduct of foundry processes has met with wide approbation. In the November/December issue of the bulletin issued by that organization, there appears another of this sort of article; it is devoted to the removal of feeder-heads from steel castings by oxy-cutting. Treatment of castings weighing from about 10 lb. to 2 cwt. is dealt with and the plant described is reported to show the following advantages:—Reduced fatigue of the operator as a result of working constantly in a natural position; reduced handling of castings between shotblasting and feeder-head and runner removal; introduction of a rational method of handling; convenient arrangement of plant essential for the removal of runners, etc.; orderly disposal of the runners and heads, and tidiness at the working place.

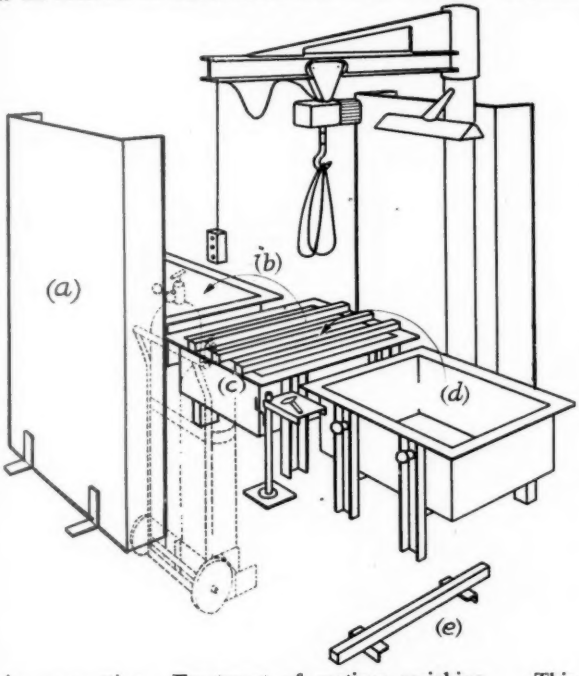


FIG. 1.—*Layout of plant for the removal of feeder heads, etc., by oxy-acetylene cutting: (a) screen; (b) castings; (c) runners; (d) untrimmed castings, and (e) removable bars for the stillage taking the runners.*

Basic Ideas

Fig. 1 shows how, in a minimum of space—since the area occupied is no more than about eight sq. yd.—these objectives can be realized, and the plant rapidly installed at low cost. It essentially comprises the following parts:—(1) Three standard stillages, capable of being moved by fork lift, by towing or lifting, or by jib-crane. These hold the castings to be cleaned, the runners and risers, and the processed castings; (2) a jib-crane carrying a pulley; (3) a mobile cutting-off station, where a burner is connected directly to a central oxy-acetylene plant located elsewhere; (4) a stand for positioning the necessary tools; (5) the burner (regulated by a by-pass adapted for economizing gas or with such a device incorporated in the burner itself); (6) one or two screens (according to the layout selected in relation to the other activities nearby), and (7) individual lighting fixture.

Working Details

Castings taken straight from the shot-blast, for example, are loaded into stillages which are placed in position progressively in advance of the man employed at the cutting-off plant. According to their weight, the untrimmed castings are lifted either manually or by using the crane and placed on detachable bars forming the grid, in such a manner that after removal the runners fall into the stillage beneath. The spacing of the bars controls the size of the castings to be processed. Then, after head removal, the castings are placed in the third stillage.

This makes possible a controlled cycle of operations at the cutting-off plant. A stillage full of untrimmed castings is replaced by an empty one, and an empty one becomes filled with castings freed from runners. The taking away of the stillage receiving the runners and risers is required less frequently—except in special cases.

Simple Installation

This description, purposely made schematic, shows up the advantages of such an organization. However, it cannot be regarded as the ultimate, because in such matters other layouts can be equally valuable if based on the same premises. The writer of the French article states he has seen layouts of this type, well suited for large-scale installations. The plant described would seem to facilitate the handling of castings where production is carried out in some quantity.

Northern Aluminium's Venture in New Zealand

A new branch of its aluminium fabricating industry in New Zealand is to be established shortly by the Northern Aluminium Company, Limited, London, W.C.2.

The new plant will have an initial annual production capacity of 5,000 tons of aluminium sheet and foil products and 2,000 tons of aluminium wire and cable for electrical transmission lines. The location of the plant has yet to be decided; alternative sites in the North and South Islands are being considered.

The venture will be backed by Aluminium, Limited, of Canada, of which Northern Aluminium is a subsidiary. The project will require a total investment of approximately £2,000,000, almost the whole of which will be provided by Aluminium, Limited, and Northern Aluminium. The plant will incorporate the best techniques from British and Canadian experience, and will be planned to supply practically all New Zealand's requirements of sheet and cable products and to allow for expansion in all fields as required.

The general manager of the New Zealand branch will be Mr. T. E. L. Ashley, who has spent over 30 years in the aluminium industry in England and has been manager of the company's plant at Banbury for 25 years.

David Brown plans US Affiliation

Purchase of "a substantial minority interest" in the US gear manufacturing firm, Foote Bros. Gear & Machine Corporation, of Chicago, is proposed by the David Brown Corporation, Limited, the British engineering group. Subject to approval by the American shareholders, David Brown will acquire immediately 15 per cent. of the shares with an option of a further 30 per cent. Each share will cost $9, and the first part of the deal is expected to cost nearly £500,000.

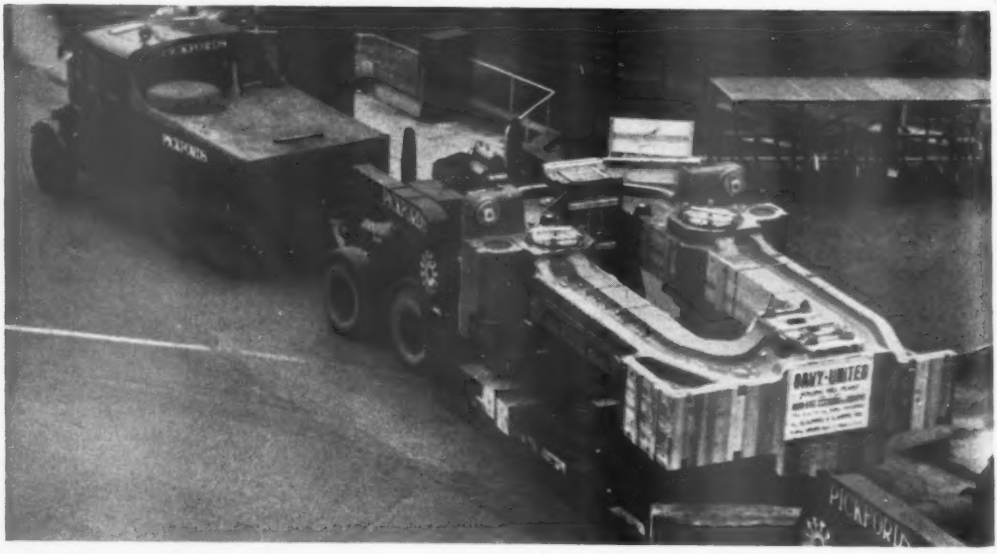
It is stated that if approval is given of a reclassification of Foote Bros. capital stock, David Brown will acquire a substantial minority interest. The David Brown Corporation will be represented on the board of the American company by Mr. David Brown, sen., and Mr. Allan Avison, a deputy managing director.

The British company, which is one of the principal makers of gears in Europe, was founded in 1860 and employs nearly 10,000 people in 20 factories throughout the world. Foote Bros., also founded 100 years ago, makes gearings and precision equipment for aircraft and missiles.

Commenting on the proposed affiliation, Mr. Brown said: "It will make possible the cross-licensing of manufacturing rights for certain products of the two companies and permit world-wide distribution under a combined name.

Mill Housings for Durgapur Steelworks

The illustration shows a 74-ton mill housing leaving the Sheffield works of Davy & United Engineering Company, Limited, bound for Calcutta. Two such housings will be used in the blooming mill at a steelworks which is being constructed by the Indian Steelworks Construction Company, Limited (ISCON), at Durgapur for the Indian government. The steelworks will cost £100,000,000, *and is being built by a consortium of thirteen British manufacturing and electrical firms.*



Provision of Protective Clothing:

House of Lords Ruling

By "Barrister-at-Law"

The House of Lords have by their recent judgment in Qualcast (Wolverhampton) Limited, *v.* Haynes, cleared the air, as it were, on the question of an employer's duties in connection with the provision of protective clothing for workmen.

The law on this subject has become clogged by the multiplicity of decisions which have been given by the judges, and by the regard that other Courts have subsequently paid to them. The error, however, into which lawyers have fallen, as the House of Lords pointed out, was to treat these decisions as if they established new principles. In point of fact, the judges who have tried such cases, in the majority of instances, have been merely performing the function which juries performed when cases of this kind were heard before a judge and jury. The decisions given therefore merely embodied the ideas of the judges on questions which ultimately were questions of fact. But because the judges usually set out the reasons which led them to arrive at these conclusions of fact, the practice had grown up to treat these reasons as if they were establishing legal principles.

The House of Lords emphasized that these decisions were not to be treated as if they created legal precedents which had to be slavishly followed. The question in each case was one of fact, and therefore it was open for a judge to arrive at a different conclusion from that arrived at in a previous case in similar circumstances.

Facts of the Qualcast Case

The Qualcast case illustrates how the Court of first instance erred in considering that a decision given in an earlier case, in which the circumstances were very similar, was to be treated as a judicial precedent which therefore had to be followed.

In the Qualcast case, the workman was an experienced moulder who had been employed by the defendants for some 12 to 13 weeks, when he was injured as the result of molten metal splashing on to his foot. The injury would have been avoided had he worn a pair of protective spats, which would have been supplied to him by his employers free of charge out of the stock regularly kept at the factory. Protective boots were also kept at the factory. These, however, were not issued free, but could be obtained at the factory at cost price. The workman was well aware that spats and boots could be obtained at the factory, in the former case, free, and in the latter at cost price, but he had not availed himself of these facilities. On the other hand, as he was an *experienced moulder* he had *not been directed* or advised by his employer to wear spats.

In an action for damages brought by the injured workman against his employers, the trial judge took the view that as the workman was an experienced moulder, no warning was necessary in his case, for he was fully aware of the risks involved. The trial judge accordingly was inclined to hold that there was no negligence on the part of these employers, but having regard to some earlier decisions given in similar circumstances, he felt he was precluded from giving effect to this conclusion, and he accordingly held the employers liable.

The House of Lords reversed his decision and held that no responsibility attached to the employers. In delivering judgment, one of the noble Lords, Lord Keith, stated that here was no principle that in all cases and in all circumstances an employer was liable to see that a foundryman was supplied, or supplied himself, with protective spats or boots, or at the lowest, that he was under any duty to urge the employee to avail himself of such protection.

It was pointed out, at the same time, that the Iron and Steel Foundries Regulations 1953, while requiring the provision of a series of protective apparatus, made no mention of boots, spats or other protective foot or leg equipment. The scope of the obligation to provide protective equipment varied with the particular circumstances of each case.

In the opinion of Lord Denning the question whether or not an employer had provided a "proper system of work," was a matter for evidence and not for law books. It changed as the conditions of work changed, and the standard went up as men became wiser as to the risks run.

Conclusion

The lesson to be learned from this case would appear to be that except where some Regulation makes the provision and wearing of protective clothing compulsory, the question whether the employer has provided a proper system of work, and whether he has discharged his obligations to the workman in connection with the provision of protective clothing, must in each case be a question of fact. Each case will depend on its own particular facts. Thus, whilst it might be very necessary to advise and encourage an inexperienced workman to wear protective clothing, in the case of an experienced workman this may not be necessary at all, and in this case the employer will be regarded as having performed his duty sufficiently merely by making protective clothing of the particular kind available for the workman if he should choose to wear it.

HEPWORTH & GRANDAGE, LIMITED—Mr. Kenneth McMahon has been appointed to the board as works director. He will be responsible for production, development, and tooling.

Company News

QUALCAST, LIMITED—In announcing an increase in the interim dividend of 2½ per cent. to 10 per cent. for the year ending June 30, 1959, the directors state that the increase is mainly to reduce the disparity between interim and final payments. The 1957-58 final was 16½ per cent.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED—A quotation has now been granted for £70,684 ordinary stock issued to employees in 1956 at the time of the rights issue. Employees were given the right to participate in the issue, but subject to a three-year restriction on the transfer of stock allotted to them.

HAWKER SIDDELEY GROUP, LIMITED—Applications from ordinary shareholders have more than twice covered the company's £15,000,000 5¾ per cent. convertible debenture issue. The basis of allotments will be announced later. It was hoped to post allotment letters over the weekend, in which case dealings were to start last Monday.

RICHARD CRITTALL & COMPANY, LIMITED, heating, ventilating, and air conditioning engineers, of London, W.1—Group profits have expanded from £185,093 to £222,829 in 1958, and the dividend is raised from an equivalent of 15 per cent. to 17½ per cent. on the £525,000 one-class capital. The net profit is reduced from £147,715 to £140,407.

COVENTRY MACHINE TOOL WORKS, LIMITED—The 1958 distribution is being effectively raised by 8¾ per cent. The company announces an unchanged dividend of 17½ per cent. and a special interim of 8¾ per cent. for 1959, which will not be taken into account when considering further dividends. In addition a one-for-two free scrip issue is proposed. Group profits have expanded from £63,713 to £75,322.

BRITISH ALUMINIUM COMPANY, LIMITED—Group manufacturing and trading profits declined to £2,105,394 (£3,020,706) in 1958, after depreciation of £844,848 (£810,165) and transferring £120,000 (£200,000) to plant replacement reserve. After tax of £1,180,024 (£1,617,345), the net profit is down to £1,030,242 (£1,247,389). The dividend is 17½ per cent. (against 12 per cent., of which the 4 per cent. interim was on a smaller capital).

CONSOLIDATED ZINC CORPORATION, LIMITED—Offer to ordinary shareholders of 1,455,100 ordinary shares at 48s. each has been accepted to the extent of 1,417,685 shares, equivalent to 97.4 per cent. Applications for an additional 1,110,519 were received for the remaining 37,415 shares and these have been allotted on the basis of applications for up to five shares in full and all other applications five shares. No allotment was made to any holder of less than six ordinary shares on February 27.

FOLLSAIN-WYCLIFFE FOUNDRIES, LIMITED—It is intended in the near future to submit proposals whereby the company will cease trading and will be the parent of two subsidiary trading companies. Full details will be furnished to members soon of the proposed capital acquisition of John Tann, Limited, safe and strong room engineers, of London, E.C.1. Following the record figures of tonnage output, turnover, and profit for 1957, Mr. H. M. Jones, the chairman, says it is disappointing to have to report lower figures all round for 1958. The beginning of the current year has shown signs of improved trading conditions and if the increase in demand for products is maintained Mr. Jones says there is no reason to suppose that profits will show any further decline.

W. WILLIAMS & SONS (HOLDINGS), LIMITED, non-ferrous metal founders, etc.—Having regard to the change in profits tax legislation, the directors have decided not to pay a final dividend for the year ended February 28, but have declared a special interim of 7 per cent. on account of the year ending December 27, 1959. An interim of 5 per cent. was paid on October 25, 1958. The 1957 dividend was at the rate of 12 per cent. per annum. Group profits for 1958 were £50,157 (£74,610). The chairman, Mr. W. Williams, says the bronze foundry side of the business has suffered a reverse in the year, due to the closing of several hand mills, tinplate and sheet works, and also the curtailment of orders for railway-wagon bearings. The bronze foundry, however, which is capable of producing castings in bearing and acid-resisting alloys up to a weight of 3 tons, has opened several new accounts in the year, and with the coming of new steelworks to the Newport district, views the long-term future with reasonable confidence.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

805,451. G. L. Willan, Limited, 38, Sussex Street, Sheffield, 4.

Graphite moulds of the type in which a two-part mould, split vertically, provides long horizontal cavities to produce a number of bars of steel or other alloy. These cavities are fed from a runner of refractory ceramic emerging at the upper face at one end of the mould assembly. The invention should be particularly interesting in the preparation of such metals as carbon steels, heat- and corrosion-resistant steel-alloys, and nickel-base alloys.

805,465. V. Tarquinee, Shouwveg, 55, Wassenaar, The Netherlands, and R. J. Scovill, Jr., Box 1059, Ogden Dunes, Indiana, USA.

Improved methods and apparatus for the continuous casting of ferrous metals.

805,486. J. Poudevigne, 2, Chemin Vicinal de L'Argile, Marseille, Bouches du Rhone, France.

The patent deals with the prevention of blowholes during the casting of ingot moulds.

805,823. Foundry Services, Limited, Long Acre, Nechells, Birmingham, and J. Knowles & Company (Wooden Box), Limited, Woodville, near Burton-on-Trent.

This present invention refers to the manufacture of metal ingots and castings, and particularly to the casting of steel and other metals in ingot form. (See also Patent Nos. 627,678; 774,490; 774,491; 769,719, FOUNDRY TRADE JOURNAL, April 25, 1957; 775,380; 772,273; and 785,984, February 20, 1958.)

806,313. Société D'Electro-Chimie, D'Electro-Metallurgie et des Acieries Electriques D'Ugine, rue du General Foy, Paris, Seine, France.

The continuous horizontal casting of such metals as aluminium and its alloys and magnesium and its alloys.

806,497. Karl Schmidt, Metallschmelzwerk, G.m.b.H., 1-11, Schockenriedstrasse, Stuttgart-Vaihingen, Germany.

Improved methods for stacking castings for storage or for transportation. The invention refers particularly to ingots which, it is suggested, are better cast so as to have a trapezium-shaped cross section with lugs. The ingots are firmly locked into position one with another. Stacking without overbalancing is thus achieved.

American Letter

Small Cars planned for 1960

According to a recent statement in the American Press, Ford Motor Company have confirmed that they will introduce a smaller car in the 1960-model year. Ford have given no details as yet, but industrial reports indicate that the smaller car will be a six-cylinder model, built on a 109-in. wheelbase.

Chrysler president, L. L. Colbert, has said that Chrysler are nearing the climax of a 10-year, 10,000,000-dollar small-car development programme. However, Chrysler will wait for Ford and General Motors to make their moves in the small-car field before making firm production plans. Both Ford and GM are expected to start producing their small cars by the coming autumn. If Chrysler's decision on small cars is "yes," the car will be on the market before the end of the year.

With imports, which totalled 377,000 in 1958, the total smaller-car market this year has been estimated as high as a million cars. George Romney, president of the American Motors Corporation, has said that the "upheaval" evident in the automobile market is the "signal for the end of the big-car sales dominance," and he predicted that the compact car would soon take over the leadership, and that smaller-car sales would reach three million a year by 1963.

Nitrogen in a Nickel/Chromium Alloy*

A study was made to determine the effect of nitrogen on the creep-rupture properties of an alloy (78 Ni - 19 Cr - 2 Ti - 1 per cent. Al) which was subject to precipitation hardening by the γ' phase, Ni_3 (Al, Ti). The study was designed to (*a*) determine if nitrogen was beneficial or deleterious to properties, and (*b*) with this established, to study the effects of nitrogen on the structure of the alloy, and relate these structural effects to properties.

Method

Heats were prepared in a vacuum induction-melting furnace, and the nitrogen content was increased from 0.003 to 0.034 per cent. The influence of nitrogen on the creep-rupture properties was evaluated by tests at 11.7 tons per sq. in. at 732 deg. C. Raising the nitrogen content from 0.003 to 0.013 per cent. increased creep resistance by a factor of 3. Several structural effects indicated that the increased creep resistance was related to the increase of nitrogen in solution prior to creep-rupture testing. The delay in the initiation of tertiary creep was related to the increased time required for the appearance of micro-cracks. The results are applicable to precision-cast products of thin section.

Battelle Materials Research

Studies in materials research are under way at the Battelle Memorial Institute, Columbus, Ohio. The key to these studies is equipment designed to give a combination of ultra-high pressure and temperature. Although previous materials research has utilized both pressure and temperature independently, their combination provides a relatively new area for investigation. To facilitate the Battelle studies, the latest of four high-pressure, high-temperature cells developed at the research centre has just been completed. This cell will be capable of handling specimens up to ¼ of a cub. in. in size. The other three cells, developed over a two-year period, have produced reactions at temperatures in excess of 2,760 deg. C., and at pressures in excess of 446 tons per sq. in. The cells have been designed to operate at much greater pressures, and, operating at room temperature, they have provided pressure in excess of 900 tons per sq. in. Commenting on the equipment, Mr. R. B. Fischer, chief of Battelle's physical-metallurgy division, said that the equipment provided a new tool (*a*) for studying existing materials, and (*b*) for making new materials by forcing atoms into positions they are reluctant to take during conventional processing.

Steel Hydrogen-content Determination*

The method under consideration uses the hot-extraction technique for extracting hydrogen from steel, and employs a Pirani† gauge for the analysis of the hydrogen content of the extracted gases by the thermal-conductivity technique. The furnace section is made a part of the gas-collecting volume. The results obtained with the gauge compare satisfactorily with those obtained with conventional apparatus and procedure which employed the hot-extraction technique. For a sample size of approximately 2 gms. the determination is completed in 5 to 10 min. from the time that the sample enters the hot zone of the furnace. The time taken from the sampling of a molten bath to the completion of an analysis is about 15 min.

Solution of Ni/Cu in Lead‡

The authors' describe rotation of a thimble-shaped specimen in molten lead, at velocities varying from a surface rate of 8 cm. per sec. to 126 cm. per sec. Temperatures involved were 528 deg. C. and 727 deg. C. The solution of copper, nickel and copper-nickel alloys increases progressively with velocity, and the formula may be expressed as a straight-line graph. Some deviations from the straight lines occur at higher temperatures, due to the degree of saturation (or contamination) of the lead by the dissolving material.

Veritys to Keep Going

On behalf of the shareholders of Veritys, Limited, manufacturing electrical engineers, of Birmingham, an approach has been made to the liquidator by Mr. R. M. Mair, the chairman, making proposals to enable the company to continue in business and operating from Stirchley, Birmingham. It is understood the proposal would require the co-operation of the trade creditors and is based on procedure which has been used in similar cases successfully in the past.

Following a winding-up petition lodged by the Midland Bank, Limited, stockholders voted early last month for the voluntary winding-up of the company. Resolutions were also passed for the appointment of Mr. W. G. A. Russell, a Birmingham chartered accountant, as liquidator and for a scheme of arrangement safeguarding the preferential rights of the Midland Bank.

Mr. Mair states that he has been encouraged in this move to keep the 120-year-old business in operation by many representations received from customers and the trade.

---

* A synopsis of work done by R. L. Jones (Convair Astronautics) and J. W. Freeman (University of Michigan).

* Summary of a paper to be presented at the forthcoming AFS Congress in Chicago (April 13 to 17).
† A glass gauge of calibrated volume.
‡ Summary of a paper recently presented at a meeting of a section of the AIME. The authors are D. Stevenson and J. Wulff (both of the Massachusetts Institute of Technology).

Publications Received

Symposium on Recent Developments in Foundry Technology. Published as Vol. 7, No. 11, by the Technical Journals of India Private, Limited, P.O. Box 934, 24, Brabourne Road, Calcutta 1, India; price of this issue, £2.

This issue runs to nearly 400 pages and prints 46 technical papers of which nine came from this country. The papers are only fairly well balanced, for there is only one paper on aluminium castings, and none on copper-base alloys. This, however, does not mean that the symposium was without interest for non-ferrous foundrymen, for there are papers on the CO_2 Process, melting plant, sand control, mechanization, and a host of kindred subjects of real interest to everybody in the industry. The general standard of the papers submitted is high and equal in every way to those presented to European conferences and, at the price asked, is very good value for money.

Bibliography of Shell Moulding. Compiled by the Engineering Societies Library, 29, West Thirty-Ninth Street, New York 18, N.Y., USA; price $2.0 (approx. 14s.).

The reviewer confesses to some disappointment at not seeing amongst "Books, Reports, and Bibliographies"—which forms the opening section of the book—Mr. J. Rice's joint report to the Association of Bronze and Brass Founders and the British Non-Ferrous Metals Research Association, as he deems this to be the best report on shell moulding so far made available. The review goes back to 1953 and to do this requires some 25 pages. Thus the Engineering Societies Library has given an excellent service in listing the huge amount of material now available on the subject of shell moulding. The references to British contributions are indeed extensive.

The Iron and Steel Trades in 1958—a Special Review. Issued by William Jacks & Company, Limited, Winchester House, Old Broad Street, London, E.C.2.

For the first time in many years this review covers iron castings. It contains the interesting statement that "Thus although the number of castings may not have declined, it has been affirmed that the weight of engineering castings has been reduced by 3½ per cent." It is also stated that, last year, the ironfounding industry spent not less than £14,000,000 on modernization, and further substantial commitments have been undertaken during the current year.

Choice of Careers. No. 25. Woodworking Craftsmen. Published for the Central Youth Employment Executive by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 6d.

This brochure, after dealing at some length with carpentry and joinery, covers quite shortly a number of other woodworking crafts and amongst these is patternmaking. In this connection it is stated that "making patterns for use in a foundry is amongst the most skilled of all woodworking crafts." For readers, the reviewer suggests it is better to buy booklet No. 21 in the series; it is 6d. cheaper, and is entirely devoted to patternmaking in the foundry.

Lloyd's Register of Shipping Annual Report for the Year 1958. Published by the Society from 71, Fenchurch Street, London, E.C.3.

Everybody in the British Isles has a natural interest in ships and shipping, and quite a few foundries have close contact with Lloyd's. This report announces that "approval was given during the year to nine firms engaged in the production of special cast irons, for the use of their material in ships classified with the Society. Nodular or spheroidal-graphite cast irons are now being used more extensively and a number of ships and engine components previously made in ordinary grades of cast iron or steel have been cast in the new material." The report is beautifully presented and excellently illustrated.

Cobalt, No. 2. Published by the *Centre d'Information du Cobalt*, 35, Rue des Colonies, Brussels, 1, Belgium.

This issue opens with a paper on a casting alloy containing 50 per cent. cobalt; 27 chromium; 23 iron; less than 0.1 per cent. carbon, and an optional 3 per cent. molybdenum, used for high-temperature applications. Other articles in the booklet deal with "Cobalt in Steels—What Improvements may be Expected?"; "Alloys for the Aircraft Industry—the Role of Cobalt", and "Cobalt Oxides as Catalysts for the Complete Combustion of Automobile Gases." Also included are about a dozen pages of abstracts germane to the subject of cobalt. It is a well-presented magazine and it appears quarterly.

House Organs

Butterley Foundry News, Vol. 1, No. 2. Issued by the Butterley Company, Limited, Derby.

It was always *sine qua non* that the worst castings made were those incorporated in moulding machines. The reviewer's belief that this does not hold good to-day is exemplified by the featuring in this *Bulletin* of an excellent casting for a large-size Osborn machine, made by the Butterley company for J. W. Jackman & Company, Limited. The inside pages of this four-page *Bulletin* cover the metallurgy of Meehanite and the use of Meehanite castings in the agricultural engineering industries. On the back page is illustrated the stage-by-stage progress of the moulding of a large pump weighing 8 tons 15 cwt. It is a fine example of the methodical manufacture of a large casting.

Foseco Foundry Practice, No. 133. Issued by Foundry Services, Limited, Long Acre, Nechells, Birmingham, 17.

This issue announces the creation of a new division to provide an advisory service to manufacturers of wrought non-ferrous material. It is to be controlled by Mr. R. G. Duckett. News is also given of a flexible Feedex feeding aid which is now to be marketed by the company. The belts of exothermic material come in foot lengths of 12 strips and these can be severed to give a range of diameters for enclosing feeders. A third novelty enumerated is a laboratory-size hand-operated mixer.

Nickel Bulletin, February, 1959. Issued by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

In this issue, the role of nickel in the field of magnetic materials is dealt with in papers delivered at a conference on non-linear magnetics and magnetic amplifiers. Some recently published American specifications for nickel and nickel-alloys are also listed and finally the use of nickel in the production of heat- and corrosion-resisting alloys and steels is outlined in a number of short papers.

Notes from the Branches

South Africa

The ever-popular "Problems Evening" proved a good attraction for the February meeting of the South African branch of the Institute of British Foundrymen, when almost 100 members and guests were present. The branch president, Mr. R. C. Cross, was in the chair, and welcomed the first speaker Mr. A. S. Beech, M.I.MECH.ENG., chairman and managing director of Foundry Equipment, Limited, Bedfordshire, who was in South Africa on a brief business visit. Mr. Beech introduced the problem entitled: "How effective is a sand slinging machine in a jobbing foundry?" He commenced by clarifying the difference between two pieces of equipment, and stated that whereas a Sandslinger, working with one cup, threw wads of sand into the mould, the Sandrammer had two blades revolving at a very high speed which directed a continuous stream of rammed sand into the mould. One of the main reasons for this type of machine being effective in a jobbing foundry was because of its flexibility, it being able to handle a wide variety of jobs in a large range of moulding boxes. Mr. Beech also stated that to his knowledge there were 174 jobbing foundries in Great Britain utilizing the Sandrammer, and some of these had three or four and others even more in operation in the same shop. Mr. Beech then answered numerous questions, dealing with the method of utilizing the machine in a jobbing foundry, the uniformity of ramming, etc.; in reply to a question about core-making, he stated that considerable success had been attained in the ramming of oil-sand cores.

Fabrication *v.* Casting

The second problem of the evening was: "Fabrication *v.* Casting" and this was introduced by Mr. J. F. Atwell, immediate past-president of the South African Institution of Welding. Mr. Atwell said that casting was an ancient art whereas welding was a new one and it was inevitable that great advances would be made in welding techniques, materials, etc., to cope with all the special alloys being introduced. Consequently, he said, it was unavoidable that certain work, which in the past might have been cast was now fabricated with these new processes, otherwise, fabrication by welding could not possibly go ahead. He concluded by stating that he thought it was incorrect to say casting *versus* welding it was rather that the practices were complementary to each other, as each had their particular field of application. One of the contributors to the discussion, Mr. A. B. Anderson, stated that his main objection to fabrication was in the making of a large number of parts of uniform size. He thought the casting had every advantage, particularly with the smaller type of product, as it was quite an undertaking in fabrication to get unity in quantity.

CO_2 *v.* Dry Sand

"CO_2 *v.* Dry Sand" was the title of the third problem, and Mr. H. A. Godwin introduced the subject by stating it was obvious that with intelligent application, the CO_2 Process could replace dry-sand moulding in the foundry. Experience in his own foundry had only been with castings in iron of up to about 800 lb. Satisfactory results had been achieved, however; a dry-ice converter had been installed and the scope of the Process was being extended. He was particularly impressed with the accuracy obtained in side plates for pumps made by the Process, the results being far superior to those previously obtained in dry-sand. A contributor to the discussion stated that he had recently visited the UK and had called on a manufacturer of ship's propellers. In this works a pit was set aside for the production of castings by the CO_2 method and the results to date, from a surface-finish point of view, were particularly pleasing. Mr. H. Hopkins stated that in his works castings were made of greater section thickness than 2 in., without any surface coating on the mould, and the finish was equally as good as with a dry-sand mould. In his opinion one of the advantages of using the CO_2 Process was the economies effected in transportation, as a mould could virtually be moulded, gassed and cast without additional crane lifts; with dry-sand moulding there was frequent crane handling to and from the drying ovens.

Advantages of Basic Cupola

The question of whether or not a basic cupola would be beneficial to all foundries was introduced by the fourth speaker, Mr. I. R. Duncan. He said he firmly believed that a basic cupola was definitely advantageous in foundries producing high-duty and nodular iron, and he would therefore confine his remarks to the grey-iron founder. Mr. Duncan stressed the care required in the operation of a basic cupola, such as ensuring that no slag came through the taphole, that coke splits kept to a constant measure and that checks were made on slag fluidity and basisity. He stated, however, that in a well-operated basic-lined cupola, pig-iron might be eliminated completely from the charge and all scrap charges used in its place. With regard to cost, the basic monolithic lining was slightly cheaper than acid bricks. A little more coke, and probably twice the amount of flux was required for basic, but this expenditure was more than offset by the tremendous saving in metal costs. He had no hesitation, therefore, in saying that such a furnace would be beneficial to all foundries. In the resultant discussion the main topics were fluidity, physical properties, carbon pick-up, etc.

Epoxy-resin Patternplates

Introducing the final problem for the evening, Mr. R. Hodgson Jnr., stated that he could well believe that in time, epoxy-resin patternplates would, to a large extent, replace those made of aluminium. First, epoxy-resin plates had exceptional surface finish; they could be easily patched, and the patch was permanent, whereas with aluminium the process of patching worn plates often gave rise to distortion. During the discussion, Mr. H. Estler stated that another point which had been obvious in his own foundry was that, due to their lightness, where hand withdrawal was practised, epoxy-resin patterns gave the moulder better "feel." Mr. Jane expressed the opinion that one of the problems of using epoxy resins was in training personnel to handle the material. Mr. Hodgson agreed that this was a problem, but felt it could be overcome by perserverance and enthusiasm.

Mr. Cross concluded the meeting by thanking the main contributors and all who had taken part in the discussion.

WORKS VISIT

The first works visit in 1959 of the branch was to the Pretoria Works of the South African Iron & Steel Industrial Corporation (ISCOR); over 80 members and guests attended. The party was divided into two groups and taken in buses, the one group to see the new ingot foundry and the other the new 70-ton electric furnace. Later in the afternoon, the parties switched over, so that both departments were visited by all the guests.

Notes from the Branches

Ingot Foundry

The foundry produces all the ingot moulds for the Pretoria and Vanderbijl steelworks; the largest ingot mould being made weighed 16 tons. The foundry, 640-ft. long by 60-ft. wide, is serviced by four overhead cranes, comprising one 35-ton, two 25-ton and one 20-ton capacity. The moulds and cores are rammed in specially-prepared pits, using pneumatic rammers. The cores are dried overnight in four gas-fired drying ovens each measuring 18- by 20- by 12-ft. high, and the moulds are also dried overnight on specially-constructed gas frames. The melting and metal-handling facilities are the outstanding feature of this foundry. There are two 78-in. dia. Whiting cupolas working on alternate days, providing the present daily requirements of 150 tons of cast iron; they are acid lined, and although rated for 20 tons per hour are to date providing 26 tons per hour. The cupolas are front slagging and the molten metal is delivered into 15-ton receivers which are gas fired. The charging bay is serviced by a five-ton overhead crane and the three-ton burden is mechanically charged into the cupola using the conventional wish-bone system.

Electric Furnace

The new furnace, reputed to be the largest in the southern hemisphere, was commissioned in August, 1957. It is a 70-ton capacity arc furnace designed by the Electric Furnace Company, Limited, of Weybridge, and built to the instructions of D. Drury & Company, Limited, by East Rand Engineering Company, Limited, and A. Stuart, Limited, both of Germiston, South Africa. It is a top charged, direct-arc, tilting furnace with three 18-in. dia. graphite electrodes connected to a 15,000 kva transformer, which is fed from a 33 kv supply and is fitted with "on-load" tap changing. The furnace shell has an inside diameter of 18 ft. 6 in., giving a nominal capacity of 70 short tons. Tilting is hydraulic to maximum angles of 40 deg. forward and 15 deg. backwards. In the first full month of operation, 6,800 short tons of tonnage steel were made, with an average power consumption of under 500 kwh per ton, and electrode consumption of under 8 lb. per ton of steel melted. The furnace bottom is flat and supported on a robust chassis. This simple construction makes bricking of the lining easier, and will facilitate the fitting of a non-magnetic steel plate to the furnace bottom, should an induction stirrer be required at a later date. The visit was concluded by refreshments being served in the works canteen, when the branch president, Mr. R. C. Cross, thanked the management for the courtesy extended and assured them the visit had been most interesting to all concerned.

Anglo/Czech Trade Talks

Discussions have been taking place between representatives of the United Kingdom and Czechoslovak Governments to establish quotas for 1959 under the trade arrangement signed on October 22, 1956. These discussions have now been concluded, and new quota lists for the calendar year 1959 will now replace provisional lists which had been established for the three months' period ended March 31. Import licences issued against the provisional quotas will be debited against the quotas now agreed for the full year. The new quotas are the same as those for 1958, and provide opportunities for trade in the goods listed at annual rates of up to some £4,400,000 for United Kingdom exports and up to some £6,400,000 for Czechoslovak exports.

Photographic and Television Exhibition

Sponsored by the *Financial Times*, an industrial photographic and television exhibition and conference is to be held at the Royal Albert Hall, Kensington, from April 20 to 24. The main purpose of the exhibition is to show how industrial photographic techniques can be applied to the smallest concerns as well as to the industrial giants. These techniques include autoradiography, cathode-ray oscillographs, cinematography, cine-micrography, document-copying machinery, electro-photographic processes, high-speed photography, industrial television, infra-red photography, microfilming, photo-electric controlled mechanisms, photomicrography, radiography (gamma and X-ray), spectrography, and time-lapse photography.

Whilst some go-ahead industrial concerns do in fact make full use of industrial photographic techniques, the potentialities of industrial photography are but little known, and in fact many companies have little or no knowledge of what industrial photography is and what it can do. It is to remedy this lack of knowledge that the exhibition and conference is being held.

Overseas Company formed by GEC

To make its wide range of experience more readily available to overseas customers, the General Electric Company, Limited, has formed a new company, G.E.C. Overseas Services, Limited. It will cover both the supply of goods and the provision of the associated service requirements in certain overseas contracts.

The company will operate as main or sub-contractors and is prepared to work in conjunction with civil and electrical contractors, mechanical engineers, or others, on complete "turnkey" contracts, or on specific projects. It will also undertake the bulk of the work formerly handled by the GEC business-development department in London, and this department has been discontinued.

The directors of the new company, which commenced business on April 1, are Mr. Leslie Gamage, Mr. D. G. W. Acworth, Mr. R. N. Millar, and Mr. H. C. Margrett, who is also the general manager.

Falkirk and the Carron Company to Celebrate

To celebrate a bicentenary and a centenary the burgh of Falkirk is to have a six-week festival from May 10 to June 24. The bicentenary is the granting of a Royal Charter to the Carron Company, which originated the light-castings industry in the area. The centenary is the development of local government powers in the burgh.

Seventeen industries will be represented in an exhibition, with pride of place going to a combined stand of the light-castings industry. The exhibition will be opened on May 20 for 10 days by Mr. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board. A banquet is also to be held for employees of the Carron Company.

ALLIED IRONFOUNDERS, LIMITED, London, W.1, has formed a domestic-appliance division to market all solid-fuel and oil-fired products. The fitted goods, Aga Heat, and the oil divisions have been merged to provide a more streamlined and rapid service. Sales director for the new division is Mr. Charles Insch, who continues as managing director of Aga Heat, Limited.

New President and General Secretary for FBI

New president of the Federation of British Industries is Mr. William H. McFadzean, chairman and managing director of British Insulated Callender's Cables, Limited, since 1954. He succeeds Sir Hugh Beaver, who has retired after holding office for two years.

Mr. McFadzean, who is also chairman of British Insulated Callender's Construction Company, Limited, and British Copper Refiners, Limited, is a director of the Midland Bank, Limited, and the Midland Bank Executor & Trustee Company, Limited. Last month he retired temporarily as industrial leader and vice-chairman of the Advisory Council on Middle East Trade, a post he had held since the Council was set up by the President of the Board of Trade in February, 1958, as a result of his forthcoming FBI duties.

A member of the Ministry of Labour Advisory Board on the Resettlement of Ex-Regulars, Mr. McFadzean is also a member of the Council of the Institute of Directors.

Mr. D. L. Walker, general secretary of the FBI, retired last Thursday after 42 years in the Federation's service. He has been elected a vice-president and has agreed to accept the appointment of honorary adviser. He is succeeded by Mr. John Gough, hitherto assistant general secretary.

In the absence overseas of the director-general of the Federation, Mr. P. F. D. Tennant, overseas director, will act in his place on FBI matters, and Mr. W. P. N. Edwards will take charge of British Overseas Fairs, as managing director. Mr. John Whitehorn, previously a member of the general secretary's department, becomes assistant to the director-general.

Latest Foundry Statistics

Steel Castings: In the joint *Bulletin* of the Iron and Steel Board and the British Iron and Steel Federation, it is stated that employment in the steelfoundry industry was, on February 7, 17,820 showing a further decline over the previous month of 140. The weekly average output of steel castings during February, estimated at 5,000 tons, was better by 200 tons than the estimated output for January. *Light Alloys:* The Ministry of Supply announces that the production of aluminium-alloy castings during January was 7,334 tons of which 4,051 tons were gravity-die-castings, 1,646 tons were pressure-die and 1,637 tons were from sand moulds. This, it is believed, is the first time that sand castings have appeared at the foot of the list. During this month 138 tons of magnesium castings were made. The totals for 1958 were 19,046 tons from sand moulds; 44,446 tons of gravity-die and 17,607 tons of pressure-die-castings; the output of magnesium castings being 1,826 tons.

METAL INDUSTRIES, LIMITED, announces that its subsidiary, Fawcett Preston & Company, Limited, manufacturers of sugar machinery and hydraulic baling presses, etc., of Bromborough, Wirral (Ches), has secured orders for three thermoplastic extruders for shipment to Italy and the Argentine. One of the machines will go to Pirelli in Buenos Aires, another to Pirelli in Turin, and the third to Cavi Electric, also in Turin. Value of the equipment, which is designed for covering cable with plastic, is put at £23,000.

AFS Foundry Technical Centre

At a recent meeting of the board of director's in Chicago, the American Foundrymen's Society authorized the board of trustees of the AFS Training and Research Institute to complete specifications for erection of the proposed new building for the Institute on the site of the Society's present headquarters in Des Plaines, Illinois—action is subject to board approval of contract bids.

The Training and Research Institute, operating as a foundation, is the first such school in North America, owned and operated by the industry, to provide foundry job training. Since early in 1957, T & R I courses have been conducted in six metropolitan foundry centres in the United States and Canada. Industry-wide acceptance of the programme by foundry management and participating personnel has pointed to an immediate need for a permanent, well-equipped location so that the scope and frequency of the programme can be broadened. The present short-term intensive courses cover basic foundry sciences such as melting materials and methods, moulding and core sands, foundry safety and environmental control, patternmaking methods and materials, materials-handling techniques and laboratory control procedures. Instructors include outstanding men from industry and educational institutions, supplementing the regular staff of the Institute.

British Standards Institution

In view of the risks of fire and of accidents if fumes should escape from solid-fuel stoves installed in caravans, the British Standards Institution has published a new Code of Practice CP. 340 "Installation of solid-fuel stoves in caravans."

The publication gives the necessary guidance on installing stoves both with and without airing cupboards and flue-water heaters; and it is believed that, if the recommendations are followed, the risk of accidents will be very substantially reduced. The recommendations include information on the design features of stoves which are desirable if the risk of fire and fumes is to be minimized, as well as other safety precautions to help the occupant not to misuse the stove. Copies of the Code of Practice may be obtained from the sales branch of the Institution, 2, Park Street, London, W.1; price 4s. (postage extra to non-subscribers).

Foundry Equipment's Fourth Overseas Company

Foundry Equipment, Limited, Leighton Buzzard, Bedfordshire, announce the launching of a new associated company in South Africa. It is to be called F.E. (South Africa) (Pty), Limited, and the head office is located at Western House, Corner of Booysens Road and Trump Street, Selby, Johannesburg. The board of the South Africa Company includes Mr. J. Davidson and Mr. R. P. Hacking, who are both resident in Johannesburg, Mr. A. S. Beech (chairman of the UK company) and Mr. J. A. Barrett and Mr. H. J. Thompson, also of Foundry Equipment, Limited. This is the fourth overseas company to be operated; the others are located in Canada, Australia and Spain. Mr. Beech has just returned from a prolonged business tour in South Africa. The company also announces that as a number of new machines have been developed recently an "open house" is to be held from May 21 to 30 at the Leighton Buzzard Works of the company.

Personal

Mr. L. BAILEY has been appointed a director of United Steel Structural Company, Limited, Scunthorpe, a subsidiary of the United Steel Companies, Limited.

Mr. D. C. GRANT has been appointed chief engineer to Cochran & Company, Limited, Annan. He was formerly deputy director of the British Coal Utilisation Research Association.

Mr. JOHN BLAKISTON, a director of W. Richards & Sons, Limited, Britannia Foundry, Middlesbrough, has been elected a director of Kitchen and Wade, Limited, Hope Works, Halifax.

Mr. GEORGE LAING has been appointed to the board of Miller Insulation & Engineering, Limited, but will continue as technical adviser. He will also be in charge of the company's London office.

Mr. L. L. ROBERTS has been appointed a director to the board of Raleigh Industries, Limited. He joins the company from the Rootes organization, where he was technical director, export division.

Mr. IAIN M. STEWART has been appointed chairman of Brown Bros. & Company, Limited, Rosebank Ironworks, Edinburgh, following the retirement of Sir WILLIAM WALLACE from the chairmanship of the board.

Mr. JAMES COLIN CRABTREE, a director of D. Mitchell & Company, Limited, Parson Street Works, Keighley, has been adopted as the Conservative candidate in the North-east Ward for the Keighley Borough election on May 7.

Dr. D. F. DENNY has been appointed chief technical executive of Pratt Precision Hydraulics, Limited, a subsidiary of F. Pratt & Company, Limited. He will be responsible for design and development of the company's products.

Mr. VICTOR BRENNER was re-elected president of the Engineering Centre, Birmingham, for the fourth successive year of office at a committee meeting held in Birmingham on April 9. Mr. C. J. GAZEBROOK was re-elected vice-president and Mr. A. G. Banks treasurer.

Mr. ERIC ARTHUR ROBINSON, deputy chairman and managing director of the Superheater Company, Limited, Trafford Park, Manchester, has been appointed chairman in succession to Sir ALEXANDER L. MCCOLL, who has retired from the board after 15 years as chairman.

Mr. GEORGE R. PARKER, B.SC., and Mr. ARTHUR R. GOW have retired from the board of Fairbairn Lawson Combe Barbour, Limited, Wellington Foundry, Leeds, but will continue as directors of the subsidiary company, Urquhart, Lindsay, and Robertson Orchar, Limited, Blackness Foundry, Dundee.

Mr. C. R. TOTTLE, deputy director and head of the reactor division of the United Kingdom Atomic Energy Authority industrial group at Dounreay, has been appointed professor of metallurgy and director of metallurgical laboratories at Manchester University, and takes up the post on July 1.

Mr. JAMES MASON, 63 years' service; Mr. S. HARDWICK, 55 years, and Mr. HERBERT ABBOTT, 37 years, retired last week from the staff of George Hattersley & Sons, Limited, textile-machine manufacturers, Keighley, Yorkshire. Each has been presented with a cheque by the directors.

Senor DON ALBERTO ULLASTRES Y-CALVO, Spanish Minister of Commerce, is visiting the United Kingdom from April 13 to 17 as the guest of Her Majesty's Government. During this time he will have meetings with the President of the Board of Trade and will also call on the Chancellor of the Exchequer and the Paymaster General.

MR. ARTHUR H. SMITH, managing director of Peglers, Limited, brassfounders, Carr-hill, Doncaster, has returned after travelling some 35,000 miles in 50 days on the firm's business in various parts of the world, including Australia, New Zealand, Canada, South Africa and Mauritius. His first call was at Benoni, near Johannesburg, where the company are opening a new factory.

The Export Credits Guarantee Department announces that the President of the Board of Trade has appointed Mr. MAURICE LAING an additional member of the Department's Advisory Council. Mr. Laing is managing director of John Laing & Son, Limited, and chairman of the export group for the constructional industries. The Advisory Council is consulted by ECGD on the commercial aspects of its insurance operations.

Mr. H. CRIVAN, head of the metallurgical department of Coatbridge Technical College, has been appointed vice-principal of the College in succession to Dr. PETER F. GORDON. Mr. Crivan who gained his B.SC. on graduation from the Royal Technical College, Glasgow, is an associate of the College; a fellow of the Institution of Metallurgists, and a member of the Institute of British Foundrymen. After graduating, he worked in England for some years, returning to Scotland in 1939 to work with Colvilles, Limited, in their Clyde Alloy Works. He started teaching in Coatbridge 10 years ago.

Mr. JOHN BROWN, deputy managing director of John Brown & Company (Clydebank), Limited, has been elected president of the Institution of Engineers and Shipbuilders in Scotland in succession to Professor J. SMALL. Mr. James Lenaghan, director of the Fairfield Shipbuilding & Engineering Company, Limited, and Mr. W. P. Walker, director of William Denny & Bros., Limited, Dumbarton, have been re-elected vice-presidents; Mr. J. C. Robertson, of William Robertson Shipowners, Limited, has been elected honorary treasurer; and Mr. Norman K. Easton, director of Alex. Stephen & Sons, Limited, has been re-elected associate councillor.

Sir EWART SMITH, F.R.S., a deputy chairman of Imperial Chemical Industries, Limited, retired on the Tuesday before last. He is 61. Between 1923 and 1942 Sir Ewart served the Billingham division of ICI in various engineering and managerial positions, including 11 years as chief engineer. He then became chief engineer and superintendent of armament design at the Ministry of Supply, an appointment he relinquished in 1945. He was a member of the Scientific Advisory Council of the Ministry of Works and Ministry of Fuel and Power from 1951 to 1954. Sir Ewart is a former member of the Advisory Council on Scientific Policy and of the British Productivity Council.

Northern Aluminium Company, Limited, announces that Mr. E. L. ASHLEY, manager of the Banbury Works for over 25 years, has been appointed a director of the company. It is also announced that the board has accepted the resignation of Mr. KENNETH HALL, assistant director of operations of the parent company Aluminium, Limited, Montreal, and a director of Northern Aluminium Company, Limited, since 1946. Mr. Ashley joined the organization in 1927 and worked in Britain and Canada before moving to Banbury as sheet mill manager in 1931; two years later he was appointed works manager. During the war Mr. Ashley was also manager of a shadow factory at Adderbury, a few miles from the main works.

Engineering, Marine, Welding and Nuclear Energy Exhibition

*Concluding the review of the above exhibition, which is to be held at Olympia, London, from April 16 to 30, further stands of interest to foundrymen are briefly surveyed.**

A. & S. OSMOND, LIMITED (*12AA, First, Empire*), are showing a representative range of their cutting-off machines, including a new 3-h.p. machine in the smaller range.

BROOM & WADE, LIMITED (*8H, Ground, Grand*). Exhibits will comprise stationary air-compressors, amongst them a new, two-stage, double-acting unit, type L2000, and pneumatic tools.

RILEY (IC) PRODUCTS, LIMITED (*12A, Ground, Grand*). This display will represent the activities of the company in the field of solid-fuel- and oil-firing, and will include working models of two mechanical stokers.

ARDLEIGH ENGINEERING, LIMITED (*42 Outer, Gallery, Grand*), will show a new electric governor, claimed to be the first of its kind to be built in Britain.

W. C. HOLMES & COMPANY, LIMITED (*6DD, First, Empire*), will display generators developed to produce inert gases to any specification by the controlled combustion of fuel-gas or fuel-oil, either continuously at low pressure or intermittently from pressure storage.

HARLAND & WOLFF, LIMITED (*5F and 4G, Ground, Grand*), will illustrate their shipbuilding programme by a large scale-model of the 45,000-ton passenger-liner Canberra, now being built at the company's works in Belfast.

MITCHELL SHACKLETON & COMPANY, LIMITED (*3N, Ground, National*), will exhibit work produced by their radio-frequency induction-hardening plant, which has an output of 125 kw. at 225,000 c. frequency, and a heat-induction capacity of 7,000 B.Th.U. per min.

C. A. PARSONS & COMPANY, LIMITED (*5E, Ground, Grand*), will exhibit a model of a turbo-generator which is claimed to be the world's largest.

J. & E. HALL, LIMITED (*7F, Ground, Grand*). The main exhibit will be a 7-in. bore × 5½-in. stroke eight-cylinder Veebloc compressor, coupled to a 240 b.h.p. G. & J. Weir double velocity-compounded single-stage geared impulse turbine.

JOHN THOMPSON (*4F, Ground, Grand*), will display the fuel loading/unloading machinery for the Berkeley nuclear-power-station. The display will be sectionalized into manufactured assemblies, scale models and diagrammatical presentations.

TANGYES, LIMITED (*5J, Ground, Grand*), will show a new type of reciprocating pump, the Hydraflo, specially designed for coal-infusion work.

* The three symbols or words in the brackets after each firm's name indicate Stand No., Floor, and Hall, respectively.

SUFFOLK IRON FOUNDRY (1920), LIMITED, Sifbronze works, Stowmarket, Suffolk, have introduced to the British market a dual-purpose cutting machine, the S.I.F.-Combi profile cutter. It can be used either as a magnetic profile cutting machine, whereby continuous production can be carried out with great accuracy by using a steel template, or as a straight line and circle cutter. The cutting motor head (12 v. d.c.) is easily detachable from the frame for use as a separate unit.

Book Reviews

Non-destructive Testing, by J. F. Hinsley, F.I.M. Published by Macdonald & Evans, Limited, 8, John Street, London, W.C.1; price 75s.

This long-awaited publication deals with almost all the features of the subject of non-destructive testing (other than dimensional inspection) which the foundry inspector and others concerned with the inspection of castings are likely to require. In his extremely well-written and readable book the author deals with the theory and the practice of each individual method, and each different method is accompanied by hints on technique. Profusely illustrated by drawings, diagrams and photographs to amplify points in the text there is a complete lack of over-elaboration. Throughout the book is vigorous and potent. Definitions of terms, the subjects of flaws and defects, radiography, ultrasonic examination, and magnetic, penetrant, sorting and miscellaneous methods (the last named an extremely novel chapter) are dealt with in turn. The chapters on diffraction and mathematics, can, of course, only touch the fringe of these subjects, but nevertheless these chapters do contain the essence of their subject matter. The question of magnetic flaw-seeking (to use the author's terminology) could benefit from a greater mention of the probe (or prod) method using half-wave rectified current, which is so popular in the USA and which has shown its usefulness in this country, particularly in respect of subsurface discontinuities. A notable omission is that of leakage testing, whether by old-established pressure methods or by the more modern gas methods. The inclusion in the appendix of diagrams originating from the Atomic Energy Research Establishment may be misleading to the unwary, since these lack essential information.

Without doubt this is the finest book on the subject of non-destructive testing to be published and every inspector can derive benefit, and not a few foundry executives also, from a perusal of the first few chapters at least.

T. A. COSH.

"Costing a Casting"

On Wednesday last week, at 7.30 p.m. in the Clarendon Hotel, Hammersmith, London, the Associaton of Bronze & Brassfounders held a second meeting to further discuss their publication "Costing a Casting." Mr. W. H. Davis, who had introduced the publication at the first meeting last November*, was once again present to explain how to install the costing system, and to answer any questions arising. He confined his lecture to the metal-handling aspects of the system, in order to avoid unnecessary complication, and in view of the limited time available during the evening.

The main points which emerged during the question-time following Mr. Davis' address were:—(*a*) a minimum period of six months' operation of the system was required before any adequate survey could be made of its efficiency, and (*b*) although the actual mechanics of the system were suitable only for the small foundry, the principles governing it could be used with advantage in larger establishments. At the conclusion of an interesting evening, Mr. Buxton, the chairman, wound up the meeting by thanking Mr. Davis, on behalf of all present, for his valuable and illuminating comments.

* FOUNDRY TRADE JOURNAL, October 30, 1958, page 542.

Mr. ALLAN RAY PUTNAM has been appointed managing director of the American Society for Metals which has a membership of 30,000.

News in Brief

SHORT & MASON, LIMITED, announce that as from May 1, they are opening a branch office in Manchester, the address of which will be:—30A, London Road, Manchester, 1.

THE FIRTH CLEVELAND GROUP is to open an office at 94, Laird Drive, Toronto 17, Canada. Mr. E. W. Nicholls, of the Firth Company, Limited, has been appointed manager.

THE ELECTRIC MOTOR DIVISION of Newman Industries, Limited, has opened an additional area office at 59, Grey Street, Newcastle-upon-Tyne 1 (telephone: Newcastle 2-3970). The new area manager is Mr. R. Martindale.

Mr. G. H. WALL, secretary of Falkirk and district local employment committee, said at a recent meeting of the committee that the light-castings industry seemed to be much more favourably placed than a year ago. The seasonal recession had been less severe than in 1958.

MR. B. C. DAVIS was the lecturer at the luncheon meeting of the Non-Ferrous Club, held last week at The Queen's Hotel, Birmingham The collection taken at the meeting on behalf of the National Society for the Prevention of Cruelty to Children realized the sum of £15 10s.

A RECORD FLOW of firm orders is reaching Leyland Motors, Limited, for its 12-ton gross Comet diesel trucks since the company announced last week a price saving of nearly £500 on these models. The saving is made up of £50 basic price reduction plus the drop of over £400 in purchase tax.

Mr. H. W. KEEBLE, a director of K & L Steelfounders & Engineers Limited, Letchworth, Herts, addressing a meeting of the North Hertfordshire Productivity Association last week, said that in the last five years overall production in the British foundry industry had increased by 10 to 15 per cent.

CATTON & COMPANY, LIMITED, steelfounders, Hunslet, Leeds, have submitted plans to Leeds Corporation Town Planning Committee for a new alloy and stainless-steel foundry, fettling shop, pattern-store and offices, comprising the first stage of a scheme for which planning approval has already been given.

A 16-TON INGOT MOULD fell from the flat-topped railway truck on which it was being delivered to the Tinsley works, Sheffield, of Thos. W. Ward, Limited, on April 1. The truck became derailed and the chains holding the mould gave way. The line into the scrapyard was blocked for some hours.

POWER-GAS CORPORATION (AUSTRALASIA) PTY. LIMITED, Australian subsidiary of the Power-Gas Corporation, Limited, Stockton-on-Tees, has received an order worth £A800,000 for one unit of carburetted-water-gas plant from the Australian Gas Light Company for their Mortlake Works, Sydney.

AITON & COMPANY, LIMITED, have assembled at their Derby works, an evaporation plant which will supply fresh water to 1,000 workers on the atomic weapons proving range at Maralinga in the South Australian desert. Only salt water is available on the site, and this has to be distilled. A similar plant supplied by the firm is already in use.

TWO 2,200 H.P. ELECTRIC LOCOMOTIVES, the first of an order worth £7,500,000, placed with Metropolitan-Vickers, Limited, by South African Railways, were due to arrive in Durban on Sunday. The engines are of the four-axle type and weigh 84 tons each. A company spokesman said it is planned to reach a delivery rate of five locomotives per month by the end of this year.

THE UNEMPLOYMENT RATE in the Sheffield area, which includes Chapeltown, Stocksbridge and Ecclesfield, has fallen in the past three months from 2.5 to 1.9 per cent., as against the national rate of 2.5 per cent. The Sheffield Employment Committee's report states that the fall was most noticeable in the building, civil engineering, steel, engineering, cutlery, tools and silverware industries.

ALLAN HAIGH & COMPANY, LIMITED, Winding Road Brassworks, Halifax, are to move the greater part of their production of industrial valves to Moorfield Mills, Halifax. The extra capacity is required for expanding production of their valves in gunmetal and steel, and for non-ferrous castings, in which the company has been engaged since its formation in 1860. The premises at Winding Road will continue in use for new ventures.

THE CONTRACT for building the purifiers for the Lurgi pressure gasification plant, now being built at Westfield on the border of Fife and Kinross, has been awarded by the Scottish Gas Board and Humphreys & Glasgow, Limited (the main contractors for the erection of the works), to Newton Chambers & Company, Limited, of Thorncliffe, near Sheffield. The cost of this new type tower purifier installation will be about £150,000.

MORGAN CRUCIBLE COMPANY, LIMITED, Battersea Church Road, London, S.W.11, will be demonstrating Crusilite furnace heating elements in two exhibitions concerned with "High Temperature in Industry by Electricity." The first will be held at the Edmund Road Drill Hall, Lancing Road, Sheffield, from April 27 to May 1, and the second at the Rutherford College of Technology, Northumberland Street, Newcastle, from May 11 to 15.

LAST WEEK an exhibition was staged at the Birmingham Chamber of Commerce by Newport, Wales, with the aim of showing West Midlands manufacturers the amenities and facilities of the Welsh town and docks. It is reported that Sir Miles Thomas, chairman of the Development Corporation of Wales, is planning a visit to Birmingham during the summer to hold talks with leading local industrialists with the objective of attracting more overspill factories from the Midlands to Wales.

THE KENT MOBILE-EXHIBITION is now on a nine-week tour of the United Kingdom and is scheduled to stop at approximately 30 different locations. It will be available for inspection by engineers and industrialists between Cardiff, Glasgow and Scunthorpe. In the last months of 1958 this travelling showroom, featuring the company's industrial instruments, undertook an extensive overseas tour which included the Scandinavian countries, Belgium, and East and West Germany.

KEETON SONS & COMPANY, LIMITED, ironfounders and engineers, Greenland Road, Sheffield, have started further expansion on the one-and-a-half-acre site where they began operations two years ago. A new shop, with a further 8,000 sq. ft. area, is being constructed for the making of machine tools of heavier capacity than previously made by the firm. The range of machine tools, particularly guillotines for sheet-metal cutting, is being extended, with a special concern for overseas markets.

MR. LEWIS CHAPMAN, chairman of Jessop-Saville, Limited, Sheffield, and president of the British Iron and Steel Federation, introduced journalists to the firm's vacuum-melting department on April 9. About

£500,000 has been invested in this plant and the department is claimed to be the largest in Europe. The latest additions are a consumable arc melting furnace, capable of melting titanium ingots up to 24 in. dia. and over 2½ tons in weight, and a 600-lb. high-frequency induction-melting furnace.

EXTENSIONS planned for the Royal College of Science and Technology, Glasgow, will cost £1,000,000. Agreement has been reached with the University Grants Committee for the four-year programme to be undertaken at the rate of £250,000 a year, commencing 1960. The building programme comprises a block for chemistry and chemical technology, and the completion of the Montrose Street engineering extension. Since the war, developments at the College have involvd an expenditure of £1,500,000.

THE CENTRAL FILM LIBRARY announce amongst the list of new releases, spring, 1959, four films on "Safety and the Foreman"—Part 1: "No One Else Can Do It"; Part 2: "Fact Finding Not Fault Finding"; Part 3: "Foresight Not Hindsight," and Part 4: "What They Don't Know Can Hurt." The films, numbered V486 to 489, run about 12 minutes and cost 5s. They have been produced by the USA National Safety Council. Further details are available from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3.

A RUSSIAN TECHNICAL DELEGATION studying zinc production and manufacture in Britain, visited factories in the West Midlands on April 10. The party, led by Mr. V. Fedorov, head of the non-ferrous metals section of the Scientific and Technical Committee of the Soviet Council of Ministers, is sponsored by the British Zinc Development Association whose representatives visited Russia last December. Works visited included the Bilston plant of Bradley & Company, Limited; the Smethwick works of Henry Hope & Sons, Limited; the factory of Frost & Sons (Moxley) Limited; and the plant of the Wolverhampton Die Casting Company, Limited.

MR. W. E. BALLARD, president of the Institution of Metallurgists, presented certificates and awards to students of the department of science at Sheffield College of Technology on April 10. He referred to the publicity given to juvenile delinquents, and pointed out that little was said of the thousands of young men and women who gave up their spare time to study, and who were the potential leaders of industry. He expressed surprise that so few females were attracted to metallurgy in Sheffield. Mr. J. Hiles, head of the department of science, reported that there were 1,473 enrolments in the department for the current session, an increase of 135 on last year.

THE FIRST SUBSIDIARY in Europe of a Canadian industrial concern was opened at Rijssen, Holland, on March 23, by the Director for Industrial Development of the Ministry of Economic Affairs, Mr. W. L. Lakerveld. The new company, Reginox, Limited, is a subsidiary of the Canadian firm, Kitchen, Limited, of Ajax, Ontario, and will produce rustless sinks. The opening ceremony was attended by the commercial attaché of the Canadian Embassy, Mr. R. Hickman, who, speaking on behalf of his Ambassador, said that Holland was favourable ground for industrial undertakings and that he hoped more Canadian firms would set up subsidiaries in the Netherlands.

INDUSTRIALISTS AND TECHNICAL COLLEGE PRINCIPALS met in Birmingham on April 10 to discuss liaison on technical education. Mr. P. F. Hancock, technical director of Birlec, Limited, said that technical personnel in industry would in future fall into well-defined categories rated to their educational achievements, and with the increasing emphasis on qualifications it was in the interests of the employee and the company to ensure that recruits were given full opportunity to achieve the highest standards within their capabilities. The chances of the office boy becoming managing director without formal qualifications were now almost nil. He went on to point out the danger in too early specialization and urged the technical colleges to provide more mixed courses. He recommended too, more interchange of personnel from industry and the college teaching staffs.

TWO BALLOTS on holiday dates conducted among Coventry's 75,000 engineering workers, have resulted in a vote to have the annual fortnight's break changed to the first two weeks in July. The result of the voting was reported to the Coventry District Executive Committee of the Confederation of Shipbuilding and Engineering Unions on April 9. Mr. C. H. Urwin, the Confederation's district secretary, said that a claim for the change would be lodged almost immediately with the Coventry and District Engineering Employers' Association. Part of the claim is for the transfer of the Whitsuntide holiday to September. Coventry Engineering Employers' Association, while admitting the desirability of spreading the period of works holidays, believes that the change is not a matter for Coventry alone and that many other industrial areas from which Coventry industries receive supplies of material and components would be affected and would have to be consulted.

Obituary

The death has occurred at the age of 72 of Mr. ABRAHAM STOPPARD, a partner in the Stoppard and Davenport Iron Founding Company, Brampton, Chesterfield.

Mr. WILFRED HOLMES, who has died at the age of 66, was a former secretary to five successive general managers of John Lysaght's Scunthorpe Works, Limited. He retired 10 months ago after having been with the company for 47 years.

The death occurred on April 9 of Mrs. ETHEL M. B. HARDMAN, a director of Hardman's Foundry, Limited, Bacup (Lancs). She was the widow of Mr. Robert T. Hardman, the former managing director of the company, who died about eight years ago.

The death is reported of Mr. ARTHUR VERNON TIDDY, assistant secretary and local director of Samuel Osborn & Company, Limited, Clyde Steel Works, Sheffield. Mr. Tiddy who was 62 started with the firm in 1911 when he was 14. He became cashier in 1942, assistant secretary in 1955, and was made a local director in 1957.

Mr. WALTER SCOTT MACLELLAN, who has died in Edinburgh, was formerly chairman and managing director of P. & W. MacLellan, Limited, engineers, Glasgow. He was 74. A grandson of one of the founders of the firm, he received his training with David Rowan & Company, Limited, engineers, Glasgow. He joined the family company in 1904, became a director in 1910, and was elected chairman in 1954. He retired in 1958 after 54 years' service. Mr. MacLellan was an original member of the British Shipbrokers' Association and the Scottish Scrap Iron and Steel Association established in 1917 to form a liaison between the steelworks, the Government and the scrap merchants.

Raw Material Markets

Iron and Steel

The demand for the different grades of pig-iron shows no appreciable change. Apart from the foundries, the steelworks' demands for basic pig-iron, which comprises the major portion of present outputs, is nowhere near the capacity levels of the furnaces. In the case also of all the foundry irons and hematite, present usage is considerably less than the capacity of the furnaces producing these grades. In addition to the fairly heavy stocks held by them, production can be greatly increased, as demands necessitate, as in many instances outputs are being kept down more evenly to balance demands.

The slight improvement in the demand for high-phosphorus pig-iron has been maintained by the makers of castings for the domestic utensil trade, and some of these foundries are better off for work than they have been for some time. The large percentage of scrap used in their mixtures, however, restricts the consumption of pig-iron and producers of high-phosphorus irons continue to have plenty to spare, as other consumers of this iron, including the jobbing and textile foundries and some of the engineering foundries, are generally taking only moderate supplies. There is little, if any, improvement in the call from the building trades for castings and the foundries supplying to them are not very busy. Judged by the overall position in the foundry industry, the establishments catering for the motor-car trade are very favourably placed, as their requirements continue to provide sufficient work to enable them to obtain reasonably good outputs. The machine-tool trade, while showing some improvement, is working much below former levels, and in consequence its consumption of castings is reduced proportionately. The overall demand for high-quality castings from many trades is at fairly good levels, and consumption of the low-phosphorus irons is relatively at a much higher rate than other grades of iron. A fairly good tonnage of hematite is also being used in addition to some refined iron. In all these irons plentiful supplies are available and most makers have good tonnages to spare from current production, although this is being kept down to moderate levels.

There appears to be little change in the overall position at the re-rollers, where trade continues very moderate. The demand for reinforcing rods is fairly active, but only moderate business is being done in small bars and light sections. Many inquiries are received from abroad, but apart from special steels business is scarce on account of the present higher UK prices compared with those of producers abroad. There has been a little more activity recently in the call for steel semis, due chiefly to the replacement of used up working stocks. Overall business, however, remains moderate and much below potential outputs of the steelworks.

Non-ferrous Metals

Copper in London came down with a bump last week, despite stocks in official warehouses showing their first fall for several weeks. It is difficult to pinpoint the cause which triggered off the sharp bout of selling, but it would appear that effective demand lagged too far behind the price, which seemed to be taking its cue from the trend of affairs on the other side of the Atlantic. In any event, the sharp break in the London market had its repercussions in the United States and custom smelters lowered their intake price for No. 2 scrap by ½ cent to 27½ cents a pound. Although reports were that the selling price of 34 cents would be held as order-books were full, one whole cent per pound came off the quotation on Friday, reducing it thereby to 33 cents a pound. And on Monday the custom smelters announced a further cut of one cent and the market weakened further. In London on Monday copper prices fell by £4 17s. 6d.

However, it must be understood that the reduction in the custom smelters' price cannot be wholly attributed to London influences, as the real nigger in the metalpile was the futures market which came under pressure when the larger speculative position which had been built up was being liquidated.

Tin has continued to be a reasonably steady market. In the East, however, the quotation has been drifting and it is thought that this is due largely to the new quota period causing greater selling pressure on the market. The drop in the US price to around $1.02 a pound was due more to sympathy with the drop in the price of copper than to the weakness of tin. The only other item of interest is the agreement reported last week on the US barter contract with Bolivia for 5,000 tons of tin metal in exchange for surplus farm products. This deal is entirely outside the quota scheme. Even so, it will raise Bolivia's sales of tin this year to a point not far below her pre-quota production rate.

Although lead in London has been a much steadier market since the US price was lopped ½ cent to 11 cents a pound, the undertone is not steady enough to convince that pressure on the present price levels will not reappear shortly. In the United States the latest statistics show that production—despite all the cutbacks—is still running ahead of production and stocks are building up to insensible proportions.

Zinc in London is trying to go better, but experiencing a very difficult time. The Canadian price was dropped a ½ cent a pound last week and the outlook for the metal cannot be stated as bright. However, the US price continues to hold and the quotation is still recorded at 11 cents a pound.

Board Changes

B. ELLIOTT & COMPANY, LIMITED—Mr. L. W. Moritz has been appointed to the board.

MODERN ENGINEERING MACHINE TOOLS, LIMITED—Mr. G. Heynes has resigned his directorship.

JOHN BROWN LAND BOILERS, LIMITED—Mr. V. A. Pask has been appointed managing director and Mr. W. V. Wright sales director.

HEPWORTH & GRANDAGE, LIMITED—Mr. Kenneth McMahon has been appointed to the board as works director. He will be responsible for production, development, and tooling.

GILLETTE INDUSTRIES, LIMITED—Mr. Willis C. Cooper, deputy chairman, has been appointed chairman. He succeeds Brig. T. Carleton Harrison, who has retired from the company.

AVO, LIMITED—Sir Charles Westlake, chairman of Metal Industries, Limited, has been appointed a director and chairman. Mr. John Black, a director of Metal Industries, and Mr. H. O. Houchen, managing director of Brookhirst Igranic, Limited, a subsidiary of Metal Industries, have also joined the board. Mr. J. H. Rawlings, managing director of Avo, has been appointed deputy chairman and will shortly be appointed to the board of Brookhirst Igranic. Mrs. E. Rawlings, Mrs. M. Brook, and Mrs. I. E. Widdows have resigned from the board of Avo; the remaining directors are unchanged. Avo recently became a member of the Metal Industries group.

The Key to Progress

Supinol Core Binders will serve you faithfully at all times and will prove a special boon to you if high standards have to be achieved and maintained and if *costs* are important.

Supinol Core Binders are the result of constant scientific research and development, of strict laboratory and production control and of understanding foundrymen's needs and problems. In this age of science Supinol Core Binders play their rightful part.

F. & M. SUPPLIES LTD.

4, BROAD STREET PLACE, LONDON, E.C.2

Telephone: LONDON WALL 7222 (4 lines)

FACTORY: CONCORDIA WORKS, LONDON, E.14

MANUFACTURERS OF

Scientifically developed and controlled Foundry Products

Imports and Exports of Iron and Steel in February

The following tables, based on Board of Trade returns, gives figures of imports and exports of iron and steel in February. Totals for the first two months of this year and last are also included.

Total Exports of Iron and Steel

Destination.	Month ended Feb. 28.	Two months ended February 28.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Cyprus	115	1,285	187
Sierra Leone	275	1,977	915
Ghana	4,161	2,468	4,901
Nigeria	6,316	11,854	10,465
Union of South Africa	3,365	16,646	11,121
Rhodesia and Nyasaland	2,615	7,083	3,595
Tanganyika	2,688	2,045	4,854
Kenya	2,301	7,089	5,593
Uganda	493	526	1,041
Mauritius	134	970	286
Aden	97	1,069	315
Bahrein, Qatar, and Trucial States	1,042	1,640	2,651
Kuwait	1,882	5,980	2,936
India	10,236	21,384	24,072
Pakistan	2,243	21,340	6,562
Singapore	2,753	7,230	4,651
Malaya	1,007	3,274	1,812
Ceylon	2,471	5,220	7,649
British North Borneo	128	356	342
Hongkong	4,471	7,987	9,894
Australia	7,721	15,913	18,053
New Zealand	7,445	34,514	15,036
Canada	8,388	30,117	17,963
Jamaica	1,347	4,072	3,363
Trinidad	2,793	9,563	5,863
British Guiana	396	1,051	982
Other Commonwealth countries	3,505	5,150	8,839
Eire	3,074	8,394	6,724
Soviet Union	290	2,464	518
Finland	1,622	8,104	3,732
Sweden	9,078	24,013	20,821
Norway	5,890	15,992	14,159
Denmark	5,803	16,555	11,739
Western Germany	6,282	1,486	17,431
Netherlands	6,331	12,411	9,882
Belgium	1,957	4,548	4,691
France	220	377	430
Switzerland	931	2,164	1,473
Portugal	1,278	2,492	2,971
Spain	1,221	8,921	2,669
Italy	4,613	6,184	7,582
Austria	161	3,017	421
Yugoslavia	720	858	796
Greece	845	3,382	1,391
Turkey	838	907	1,117
Netherlands Antilles	147	205	486
Portuguese East Africa	168	615	295
Egypt	431	6,105	536
Sudan	1,207	5,844	2,041
Lebanon	45	3,841	65
Israel	272	1,276	1,362
Saudi Arabia	410	1,380	631
Iraq	13,275	5,407	20,906
Iran	3,687	4,746	6,220
Burma	613	1,672	1,299
Thailand	192	1,196	1,785
Indonesia	322	637	609
Philippine Republic	201	479	520
USA	6,821	12,421	14,589
Cuba	738	951	1,080
Colombia	144	1,421	188
Venezuela	7,188	17,363	14,421
Ecuador	161	1,001	261
Peru	252	2,298	481
Chile	87	890	160
Uruguay	103	366	277
Argentina	14,990	25,821	40,073
Other foreign countries	23,134	20,158	29,576
TOTAL	206,130	466,165	420,349

Total Imports of Iron and Steel

From	Month ended Feb. 28.	Two months ended February 28.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Rhodesia and Nyasaland	478	1,002	581
Canada	868	3,259	986
Other Commonwealth countries and Eire	2,500	4,400	4,645
Soviet Union	—	26,312	705
Sweden	2,745	5,541	4,539
Norway	6,392	13,369	11,468
Poland	122	15	466
Western Germany	2,182	12,416	3,924
Netherlands	9,872	24,524	19,919
Belgium	1,482	18,824	2,839
Luxembourg	800	1,552	894
France	1,815	6,694	2,254
Italy	76	49	180
Austria	16	1,077	392
Japan	—	641	—
USA	479	53,352	954
Other foreign countries	664	696	1,698
TOTAL	30,491	173,732	56,394
Iron and steel scrap and waste, fit only for the recovery of metal	492	28,276	707

Exports of Iron and Steel by Products

Product.	Month ended Feb. 28.	Two months ended February 28.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Pig-iron	8,827	11,143	20,950
Ferro-columbium (niobium)	7	5	12
Ferro-tungsten	162	36	334
Other ferro-alloys	206	512	573
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	11,088	2,242	18,707
Pieces roughly shaped by forging*	51	1,151	74
Iron bars, rods, angles, shapes, and sections	64	182	128
Steel bars, rods, angles, sections, and shapes	21,110	65,059	42,045
Iron plates and sheets	6	334	12
Universal plates	368	608	1,705
Steel plates, 3mm. and under 4.5mm. in thickness	3,309	1,559	5,051
Ditto, 4.5mm. or more in thickness	7,338	32,763	17,645
Blacksheets and blackplate	22,402	58,490	40,727
Hoop and strip	5,342	9,659	11,513
Tinplate	37,775	55,970	79,238
Decorated tinplate	1,757	505	2,352
Galvanized sheets	6,953	10,051	13,731
Other (incl. tinned sheets, terneplate, and ternesheets)	1,274	2,470	2,118
Railway and tramway construction material	15,414	42,490	31,677
Wire rods of steel (incl. alloy steel)*	1,846	7,046	5,290
Wire	7,118	18,127	15,417
Tubes, pipes, and fittings	53,713	145,763	111,050
TOTAL	206,130	466,165	420,349

* The figures for 1959 are not completely comparable with those or previous years.

B. ELLIOTT & COMPANY, LIMITED, machine-tool manufacturers, of London, N.W.10—The company has purchased the ordinary capital of Adams Bros. & Burnley, Limited, manufacturers of metal pressings and fabrications, etc., of Harrow (Middx).

LAPORTE TITANIUM, LIMITED—Mr. F. S. Clark and Mr. P. G. Rennie have been appointed directors of the company, a subsidiary of Laporte Industries, Limited.

QUOD ERAT DEMONSTRANDUM

This is the new Demonstration Bay at Bedewell Works, Hebburn-on-Tyne, equipped with a range of Baker Perkins Foundry Machinery. Here you may see the latest advances in Diaphragm Moulding techniques, together with shot blasting equipment such as the Turbo 60 Rotating Drum, Rotating Barrel and Rotary Table Shot Blast Machines.

Expertly staffed, capable of providing full demonstrations of all the varied plant installed, with wide facilities for experimentation, the Demonstration Bay is an aspect of Baker Perkins service of which you are welcome to avail yourself.

BAKER PERKINS LTD
Foundry Machinery Division
BEDEWELL WORKS · HEBBURN ON TYNE · ENGLAND

BP/F3

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

April 15, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 0s. 0d. to £43 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £56 10s. 0d. to £60 10s. 0d., scale 15s. 0d. to 16s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 7s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 10s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £77 0s. 0d. to £81 0s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; over 6 per cent. C, £74 10s. 0d. to £77 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; 2 per cent, C,* 1s. 7½d. to 1s. 10½d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 9d. to 2s. 0d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 9¾d. to 2s. 0¼d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £245 0s. 0d.; 96/98 per cent., £275 0s. 0d.

Ferro-columbium.—65/72 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (home).—78 per cent., £69 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft up to 0.33 per cent. C, £38 10s. 0d.; basic hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in. and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £236 15s. 0d. to £237 0s. 0d.; three months, £236 15s. 0d. to £237 0s. 0d.; settlement, £237 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 4¼d. per lb.; rods, 260s. 6d. per cwt. basis; 20 s.w.g., 295s. 6d. per cwt.

Tin.—Cash, £782 10s. 0d. to £783 0s. 0d.; three months, £783 10s. 0d. to £784 0s. 0d.; settlement, £783 0s. 0d.

Lead (Refined Pig).—Second half April, £67 15s. 0d. to £68 0s. 0d.; second half July, £69 10s. 0d. to £69 15s. 0d.

Zinc.—Second half April, £71 10s. 0d. to £71 12s. 6d.; second half July, £71 10s. 0d. to £71 12s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £106 15s. 0d.; rolled zinc (boiler plates), all English destinations, £104 10s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £94 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10¾d. per lb.; sheets to 10 w.g., 201s. 9d. per cwt.; wire, 2s. 8¾d.; rolled metal, 201s. 9d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £159; B6 (85/15), £207.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £202; HTB2 (38 tons), —; HTB3 (48 tons), £227.

Gunmetal.—BS1400, LG2 (85/5/5/5), £197; LG3 (86/7/5/2), £207; G1 (88/10/2/½), £266; (88/10/2/1), £249.

Phosphor Bronze.—BS1400, PB1 (AID released), £292 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £215 per ton.

Phosphor Bronze Strip, etc.—Strip, 299s. 6d. per cwt.; wire, 4s. 2d. per lb.; rods, 3s. 5d.; tubes, 3s. 5d.; chill cast bars: solids 3s. 4½d.; cored 3s. 5½d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver ex-warehouse, £78 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, —; AB2, £241.